

**Final Submittal**

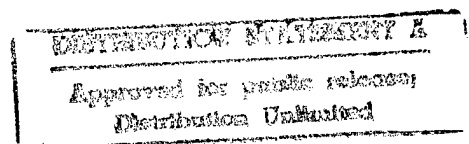
**Energy Engineering Analysis Program  
Lighting Survey of Selected Buildings  
Pine Bluff Arsenal  
Pine Bluff, Arkansas**



**Executive Summary**

**Contract No. DACA01-94-D-0038  
Delivery Order No. 0001**

**June 1995**



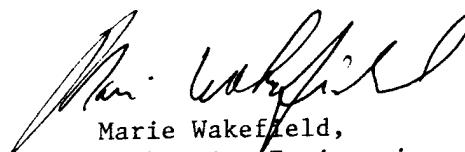


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FINAL SUBMITTAL

ENERGY ENGINEERING ANALYSIS PROGRAM  
LIGHTING SURVEY OF SELECTED BUILDINGS  
PINE BLUFF ARSENAL  
PINE BLUFF, ARKANSAS

EXECUTIVE SUMMARY

CONTRACT NO. DACA01-94-D-0038  
DELIVERY ORDER NO. 0001

PREPARED FOR:

U.S. ARMY CORPS OF ENGINEERS  
LITTLE ROCK, ARKANSAS

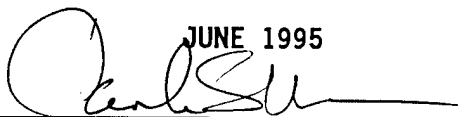
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PROJECT NO. 6941331001

JUNE 1995



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## 1.0 INTRODUCTION

### 1.1 Authorization

The Energy Engineering Analysis Program (EEAP), Lighting Survey of Selected Buildings at Pine Bluff, Arsenal, was authorized by the U.S. Army, Little Rock District, Corps of Engineers, under Contract Number DACA01-94-D-0038. Delivery Order Number 0001, dated 29 September 1994.

### 1.2 Objectives

The objectives of this Delivery Order (D.O.) are as follows:

- A. Perform a site survey of 45 buildings selected by Arsenal personnel. The purpose of the site survey is to gather sufficient data to permit evaluation of possible Energy Conservation Opportunities (ECOs).
- B. Evaluate possible and new ECOs.
- C. Combine ECOs into recommended projects.
- D. Prepare a comprehensive report to document the work performed, the results and the recommendations. The final report is to contain funds programming documentation.

### 1.3 Work Accomplished

The initial field survey of the Arsenal was performed from 15 November 1994 through 18 November 1994. During that time, a team of four engineers from Reynolds, Smith and Hills, Inc. (RS&H) performed tests, made observations and conducted interviews with installation personnel.

An additional field survey was conducted on 9 December 1994 through 11 December 1994.

### 1.4 Summary of Results

The 16 ECO evaluations that were required by the Scope of Work (SOW) were combined into eight separate evaluations. Of the eight combined evaluations, three are recommended for design and construction, based on life-cycle-cost analysis (LCC). The recommended projects are:

ECO - 1      Upgrade or replace lighting  
ECO - 4      Install occupancy sensors  
ECO - 8      LED exit signs

Combination of the three projects into one funding package will qualify the projects for ECIP funds.

When constructed, it is estimated that the projects will save the Arsenal approximately 3,135 MBtu in annual electricity use resulting in an annual cost savings of \$63,000, based on present-day electricity rates and hours of building occupancies. The combined projects have an SIR of 2.0 and a simple payback of 5.9 years.

Percent reductions in overall electricity use and cost at the Arsenal are 3.6 percent and 4.4 percent, respectively.

It terms of electricity demand and use for lighting in the 45 buildings surveyed, a 52-percent reduction is projected to be realized.

## 2.0 BUILDING DATA

### 2.1 Installation Description

Pine Bluff Arsenal, located in Pine Bluff, Arkansas, is an installation of the Armament, Munitions and Chemical Command. The Arsenal is a government-owned, government-operated installation, with the primary function of loading and packing munitions.

### 2.2 Facilities Description

As reported in fiscal year 1994, the Arsenal had 537 buildings comprising approximately 2,397,000 square feet of floor space. The lighting survey was conducted over portions of 45 buildings, totaling 424,823 square feet, or approximately 18 percent of the Arsenal's floor space. The surveyed buildings are listed below:

| <u>Bldg #</u> | <u>Description</u>                 | <u>% Surveyed</u>     | <u>Occupant</u> | <u>Surveyed Floor Space (SF)</u> |
|---------------|------------------------------------|-----------------------|-----------------|----------------------------------|
| 10-020        | Administration Building            | Partial               | MPCAO (Adj)     | 21,284                           |
| 10-030        | Administration General Purpose     | Complete              | Environ Mgt/Sec | 6,897                            |
| 10-050        | Fire Headquarters                  | Complete              | FF&P Div        | 6,532                            |
| 13-010        | Community Services Bldg            | Complete              | HQ Det          | 2,429                            |
| 13-020        | US Army Health Clinic              | Complete              | MEDDAC          | 3,844                            |
| 13-030        | 52nd EOD                           | Complete              | 52d EOD         | 3,007                            |
| 13-040        | BZ/Counseling Facility             | Partial               | MEDDAC          | 1,483                            |
| 13-060        | Clinic without beds                | Complete              | MEDDAC          | 2,835                            |
| 13-080        | Lab                                | Complete              | MEDDAC/DIR/OTS  | 4,620                            |
| 13-100        | Infirmery                          | Complete              | MEDDAC          | 1,920                            |
| 13-110        | Audio Visual Facility              | Complete              | DOIM            | 1,974                            |
| 16-210        | Barracks                           | Hall/shower/restrooms | MPCAO           | 1,389                            |
| 16-220        | Barracks                           | Hall/shower/restrooms | Dir/OTS         | 1,389                            |
| 31-010        | Elec Calibration Lab/No Conversion | Complete              | TMDE            | 332                              |
| 31-080        | Electronic Calibration Facility    | Complete              | TMDE            | 1,705                            |
| 32-030        | Inspection Garage                  | Complete              | Mob Equip       | 5,435                            |
| 32-035        | Ordnance Shop                      | Complete              | Mob Equip       | 17,640                           |

|        |   |   |                |        |
|--------|---|---|----------------|--------|
| 32-060 | Boiler & Compressor House                         | Complete  | BGU&PS Div     | 4,853  |
| 32-070 | Impreg & Laundry                                  | Complete  | Prop Mgt Div   | 18,217 |
| 32-090 | General Purpose Warehouse                         | Complete  | Mob Equip      | 7,140  |
| 32-100 | Elec/Com Calibration Fac                          | Complete  | Dir, PA        | 10,493 |
| 32-130 | Ammo Qual Assur Fac                               | Complete  | Envir/Nat Resr | 3,049  |
| 32-150 | Ammo Qual Assur Fac                               | Complete  | Envir/Nat Resr | 1,260  |
| 33-060 | Boiler/Compressor                                 | Complete  | BGU&PS Div     | 4,853  |
| 33-530 | Fill & Press                                      | Complete<br>East/West<br>ends<br>(packout<br>area only) | Prod Div       | 7,119  |
| 34-110 | WP Filling  | Complete  | Prod Div       | 86,427 |
| 34-120 | Ammo Quality Fac                                  | Complete<br>South end<br>only                           | Dir/PA         | 5,501  |
| 34-140 | Boiler/Compressor                                 | Complete  | BGU&PS Div     | 2,037  |
| 34-910 | Admin Gen Purpose/FE Maint<br>Shop                | Complete  | BGU&PS Div     | 81,407 |
| 34-970 | Admin Bldg Gen Purpose                            | Complete  | DEH            | 1,915  |
| 44-100 | Prod Fld Ofc Cplx                                 | Complete  | Prod Div       | 25,006 |
| 51-420 | Office Bldg (DMMD)                                | Complete  | DMMD           | 7,577  |
| 51-430 | Engr Admin Bldg                                   | Complete  | LRDCE          | 1,679  |
| 53-160 | Chemical Admin Bldg                               | Complete  | Dir/E&T        | 3,917  |
| 60-020 | Security Bldg (7 Days per<br>week/24 hrs per day) | Complete  | Sec Ofc        | 8,768  |
| 60-060 | Admin Gen Purpose                                 | Complete  | DMMD           | 3,478  |
| 60-070 | Fixed Laundry                                     | Complete  | DMMD           | 4,909  |
| 60-090 | TC Admin Bldg                                     | Complete  | DOL            | 1,833  |
| 60-630 | Warehouse   | Complete  | DMMD           | 8,833  |
| 63-100 | Chemical Field Maint Shop                         | Complete  | DMMD           | 7,858  |
| 63-110 | Chemical Maint Shop                               | Complete  | DMMD           | 10,040 |
| 63-120 | Chemical Field Maint Shop                         | Complete  | DMMD           | 11,349 |
| 63-200 | Chemical Field Maint Shop                         | Complete  | DMMD           | 11,804 |
| 63-210 | Mask Repair                                       | Complete  | DMMD           | 11,352 |
| 63-410 | Toxic/Conventional Change<br>House                | Complete  | DMMD           | 8,034  |

Each room in each building was surveyed to determine existing lighting conditions as discussed in Section 5.0.



### **3.0 HISTORICAL ENERGY USE AND COSTS**

All historical energy use and cost data were gathered from the U.S. Army Data DEIS (Defense Energy Information System) system, or ADDS, and from Pine Bluff Arsenal records.

#### **3.1 Energy Use**

Total facility and production energy consumption at Pine Bluff Arsenal increased by approximately eight percent from FY 85 through FY 94 (Figure 3-1). The cause was the increase in the use of thermal energy by four percent and the use of electricity, which increased 43 percent over the same time period.

Monthly consumption of heating fuels and electricity for FY 94 is shown in Figure 3-2. The dependence of heating fuels on weather is apparent, although thermal energy is required during the summer months for production and other uses. Electricity use is fairly constant throughout the year, with slight increases occurring in the summer months due to air conditioning.

Percentages of fuel use for FY 94 are shown in Figure 3-3. The heating fuels accounted for approximately 86 percent of energy use in that year and electricity the remainder.

#### **3.2 Costs**

Total annual energy costs at Pine Bluff Arsenal, \$3,085,671 in FY 94, have increased ten percent over the FY 85 values (Figure 3-4). Electricity shows the greatest increase, approximately 69 percent from FY 85 through FY 94. Unit prices for electricity showed an increase of 18 percent from FY 85 through FY 94 (Figure 3-5).

Figure 3-6 displays monthly energy costs at Pine Bluff Arsenal. As in the case of consumption, heating fuel costs vary widely, depending on weather. Electricity costs are a significant portion of the monthly costs, and can range from 35 percent of the monthly total to more than 60 percent. Electricity costs are a significant percentage of the total annual energy bill

# Pine Bluff Arsenal

## Historical Energy Consumption

Source: ADDS

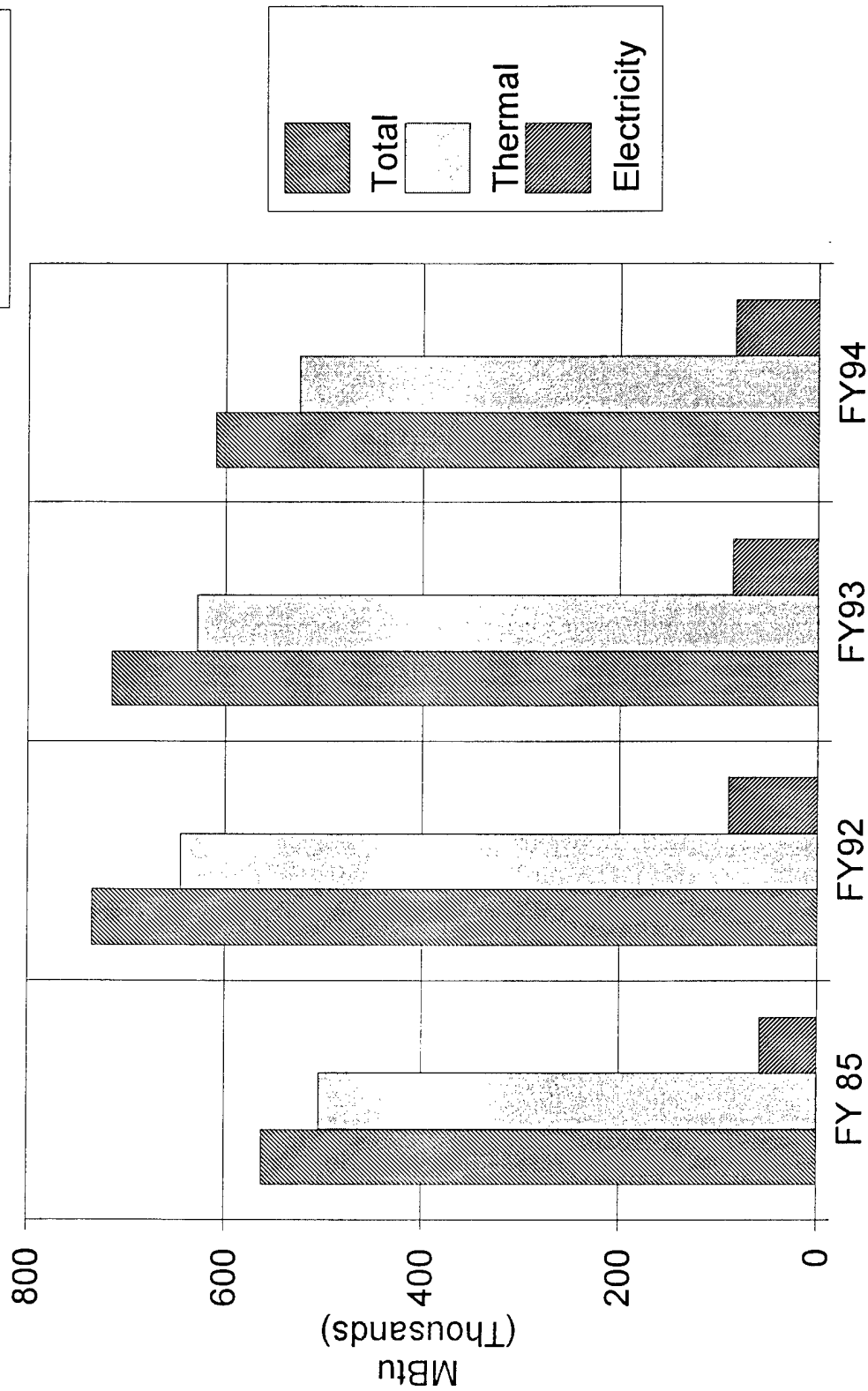


Figure 3-1

# Pine Bluff Arsenal

## Monthly Energy Consumption

Source: ADDS

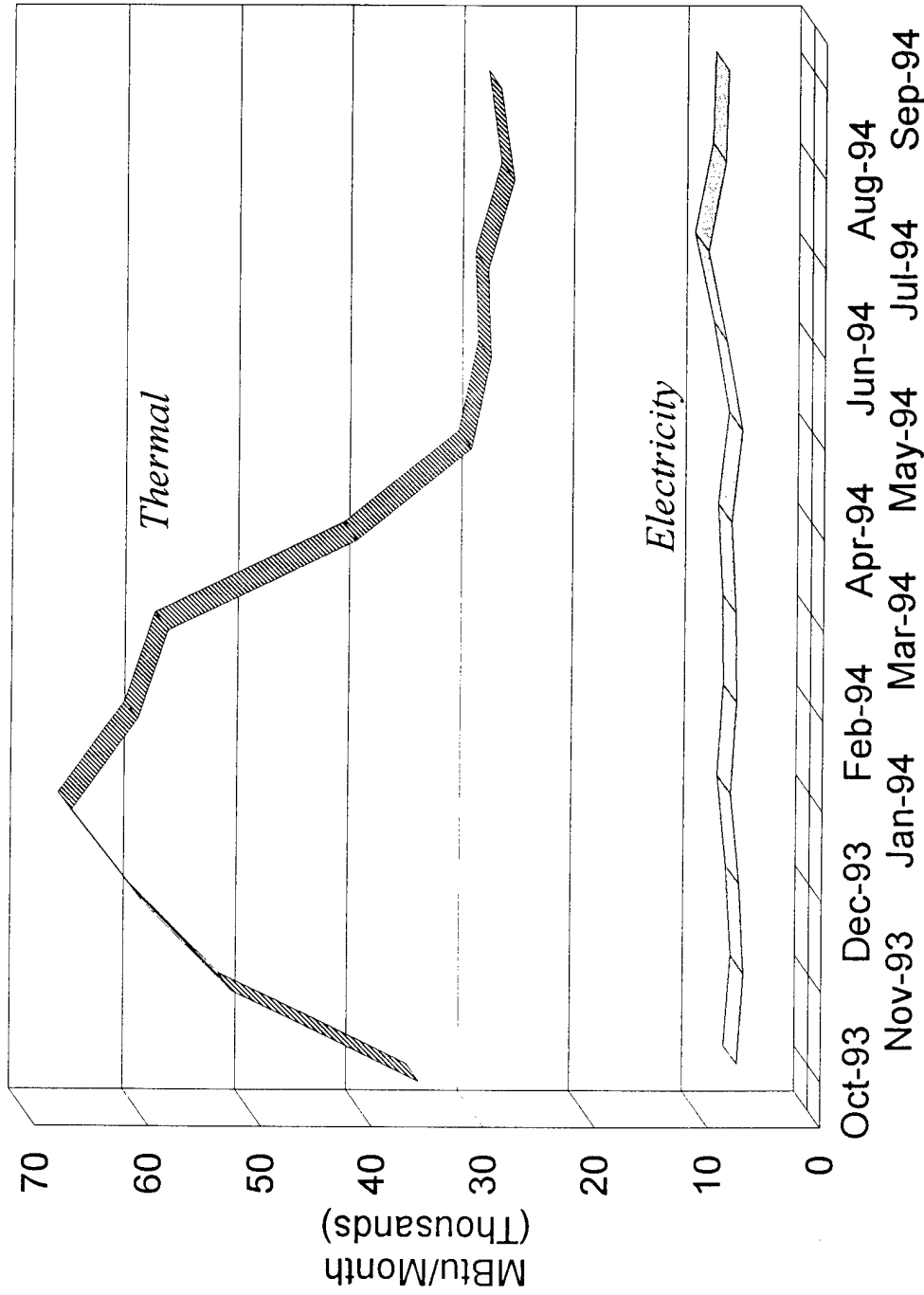


Figure 3-2

# Pine Bluff Arsenal

## FY 94 Buildings Energy Consumption

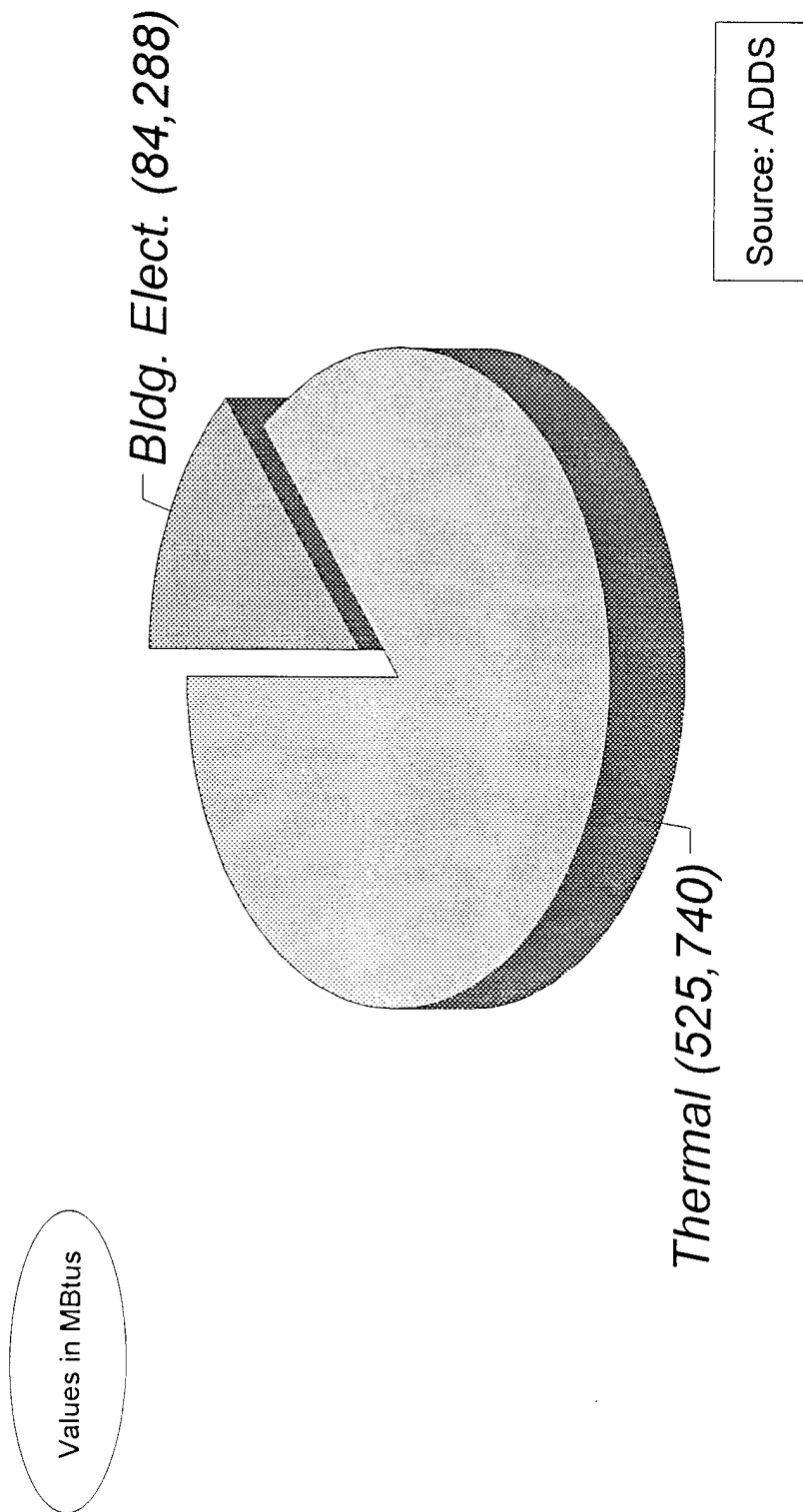


Figure 3-3

# Pine Bluff Arsenal Historical Energy Cost

Source: ADDS

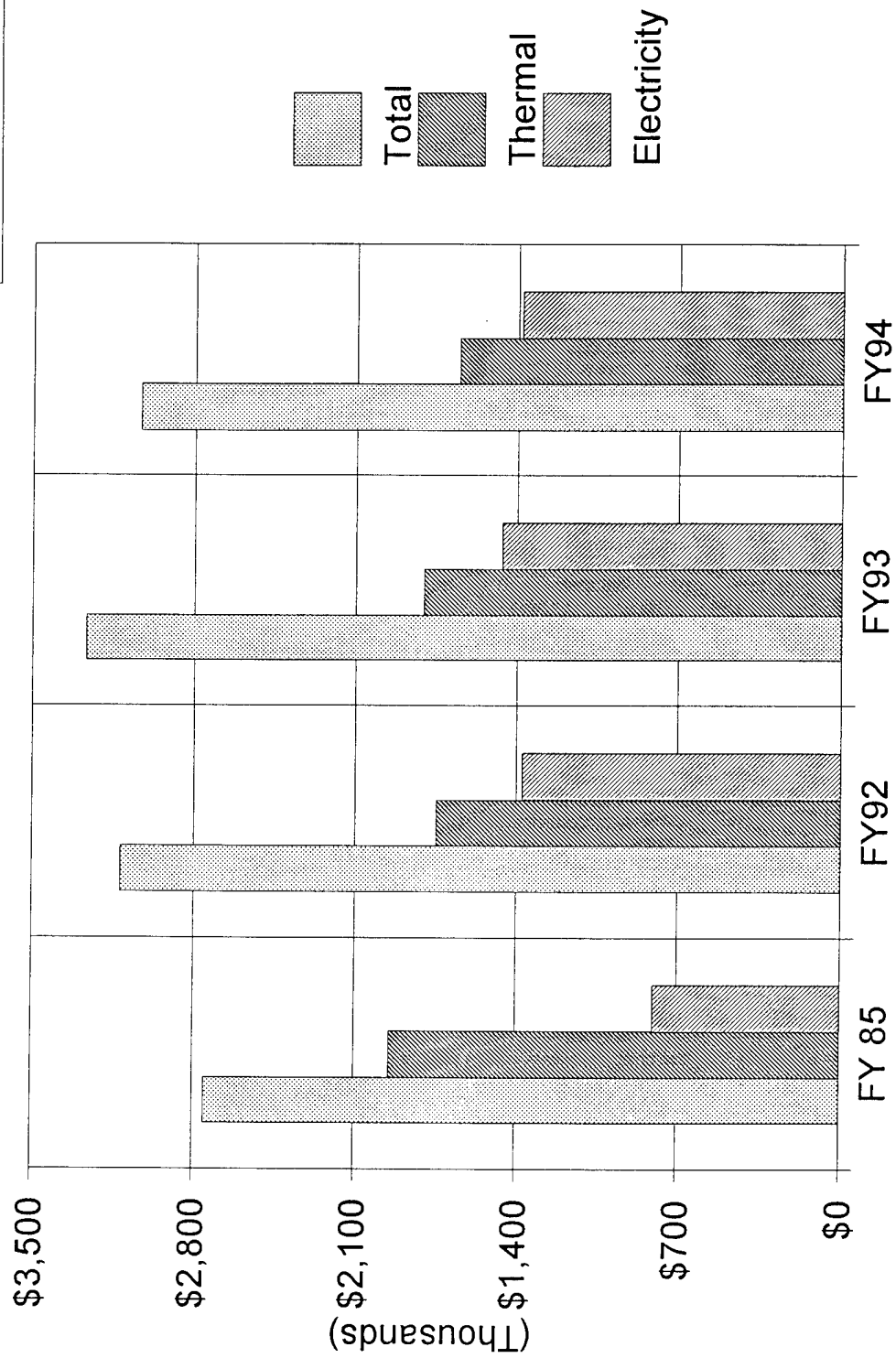


Figure 3-4

# Pine Bluff Arsenal Historical Energy Unit Costs

Source: ADDS

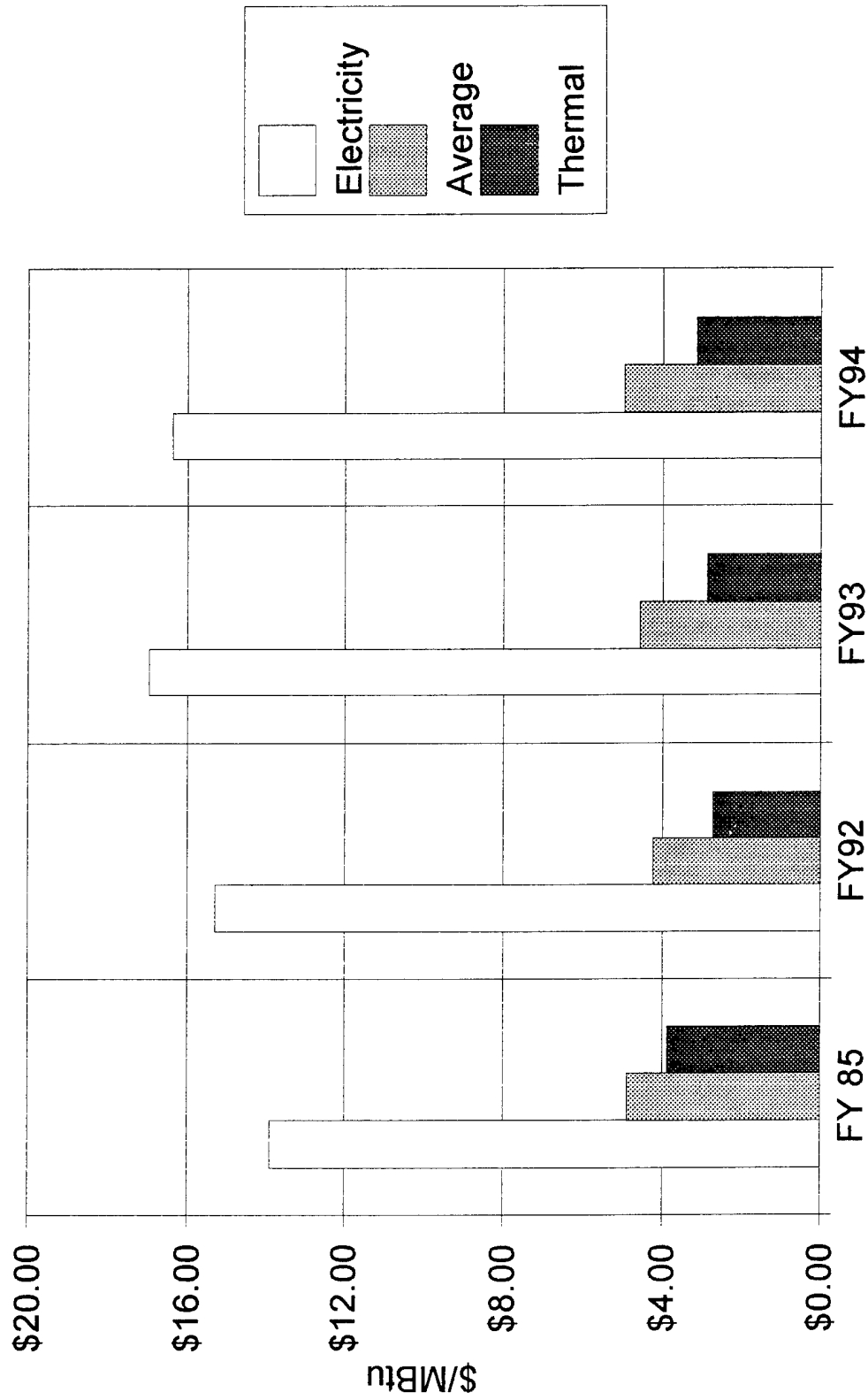


Figure 3-5

# Pine Bluff Arsenal Monthly Energy Costs

Source: ADDS

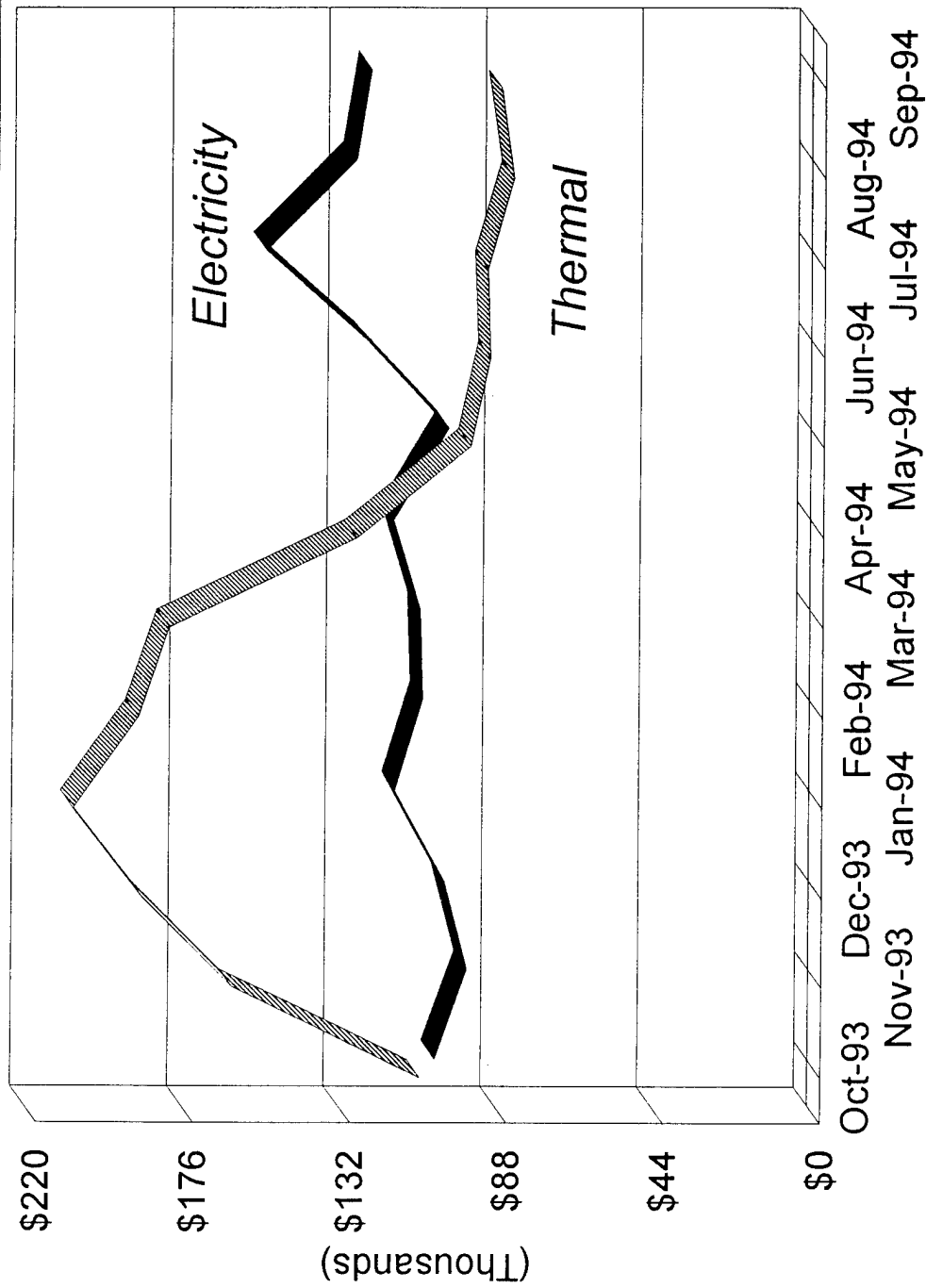


Figure 3-6

because of the higher unit price. In FY 94, electricity costs represented 74 percent of the total buildings expense of \$1,650,000 (Figure 3-7).

### 3.3 Lighting Energy

Table 3-1 shows the electrical demand in kW and estimated consumption in kWh of the present lighting system in the 45 buildings, based on 2,500 hours of annual occupancy. The table also shows the demand and estimated consumption of the recommended new system, based on the same occupancy schedule.

Percent reductions in watts per square foot, demand and annual energy use are 52 percent.

Effects of occupancy sensors and LED exit signs are not included in the above savings estimate.



# Pine Bluff Arsenal

## FY 94 Buildings Energy Costs

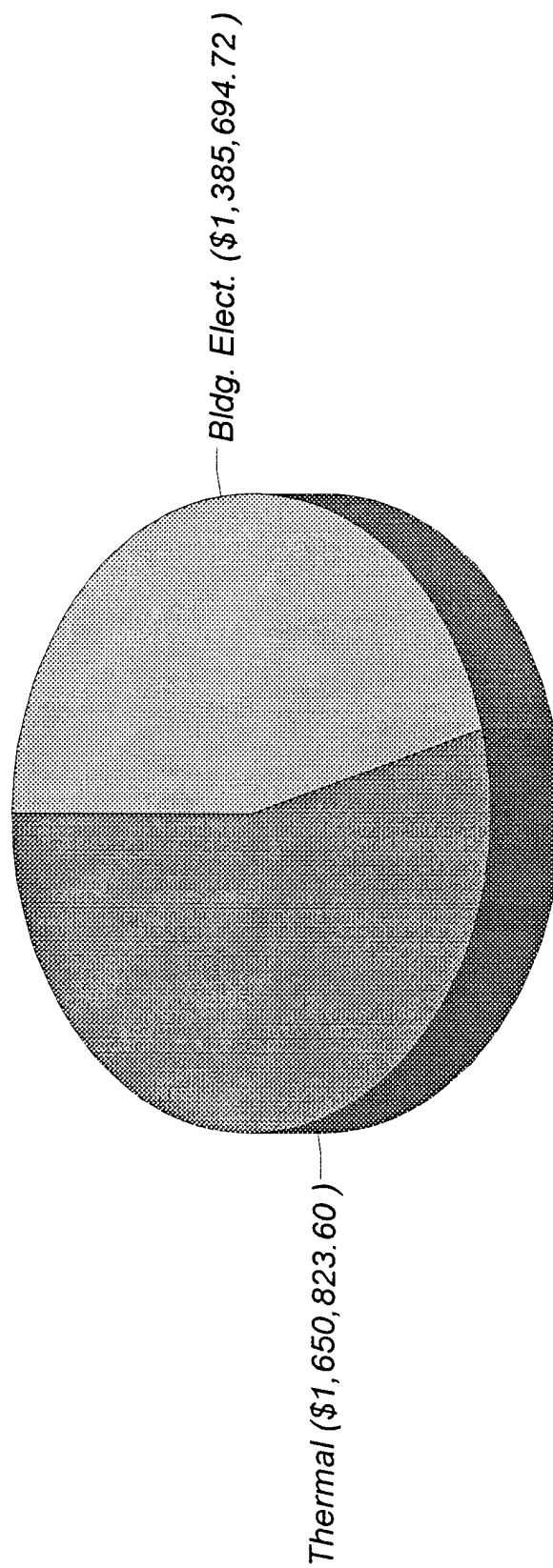


Figure 3-7

Table 3-1. Energy Analysis Summary

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|    | Bldg. No. | Function                            | Present System |      |        |         | Replacement System |      |        |         | Savings |        |
|----|-----------|-------------------------------------|----------------|------|--------|---------|--------------------|------|--------|---------|---------|--------|
|    |           |                                     | W/SF           | kW   | kWh/yr | # Fixt. | W/SF               | kW   | kWh/yr | # Fixt. | kW      | kWh/yr |
| 1  | 10020     | Administration                      | 3.0            | 38.5 | 96,215 | 214     | 1.0                | 11.9 | 29,658 | 193     | 26.6    | 66,558 |
| 2  | 10030     | Admin General Purpose               | 1.4            | 8.6  | 21,465 | 71      | 0.6                | 4.8  | 11,918 | 69      | 3.8     | 9,548  |
| 3  | 10050     | Fire HQ                             | 0.9            | 10.2 | 25,483 | 105     | 0.7                | 7.3  | 18,365 | 103     | 2.8     | 7,118  |
| 4  | 13010     | Community Services                  | 2.6            | 5.2  | 13,110 | 32      | 1.0                | 2.0  | 5,010  | 32      | 3.2     | 8,100  |
| 5  | 13020     | Health Clinic                       | 1.7            | 6.6  | 16,385 | 57      | 1.0                | 3.2  | 7,890  | 56      | 3.4     | 8,495  |
| 6  | 13030     | 52nd EOD                            | 1.3            | 3.5  | 8,798  | 26      | 0.8                | 2.2  | 5,405  | 26      | 1.4     | 3,393  |
| 7  | 13040     | Counseling Facility                 | 1.6            | 2.5  | 6,348  | 31      | 1.0                | 1.6  | 3,955  | 27      | 1.0     | 2,393  |
| 8  | 13060     | Clinic                              | 2.6            | 3.5  | 8,840  | 23      | 0.9                | 1.2  | 3,103  | 20      | 2.3     | 5,738  |
| 9  | 13080     | Laboratory                          | 3.1            | 3.5  | 8,678  | 24      | 1.3                | 1.4  | 3,458  | 24      | 2.1     | 5,220  |
| 10 | 13100     | Infirmary                           | 1.3            | 2.5  | 6,240  | 24      | 1.0                | 1.8  | 4,415  | 24      | 0.7     | 1,825  |
| 11 | 13110     | Audio-Visual Facility               | 2.3            | 4.5  | 11,188 | 36      | 1.2                | 2.3  | 5,785  | 32      | 2.2     | 5,403  |
| 12 | 16210     | Barracks (halls, showers, latrines) | 1.3            | 1.8  | 4,490  | 23      | 0.6                | 0.9  | 2,303  | 18      | 0.9     | 2,188  |
| 13 | 16220     | Barracks (halls, showers, latrines) | 1.3            | 1.8  | 4,490  | 23      | 0.6                | 0.9  | 2,303  | 18      | 0.9     | 2,188  |
| 14 | 31010     | Electronic Calibration              | 3.0            | 1.0  | 2,385  | 6       | 2.1                | 0.7  | 1,650  | 6       | 0.3     | 735    |
| 15 | 31080     | Electronic Calibration              | 1.9            | 3.2  | 8,100  | 24      | 1.1                | 1.9  | 4,870  | 24      | 1.3     | 3,230  |
| 16 | 32030     | Inspection Garage                   | 0.6            | 3.3  | 8,133  | 19      | 0.5                | 2.5  | 6,365  | 26      | 0.7     | 1,768  |
| 17 | 32035     | Ordinance Shop                      | 1.2            | 20.7 | 51,660 | 252     | 0.9                | 14.9 | 37,170 | 252     | 5.8     | 14,490 |
| 18 | 32060     | Boiler & Compressor House           | 0.3            | 1.5  | 3,640  | 10      | 0.2                | 1.0  | 2,507  | 10      | 0.5     | 1,133  |
| 19 | 32070     | Impreg. & Laundry                   | 1.3            | 14.6 | 36,573 | 104     | 1.0                | 10.8 | 27,075 | 103     | 3.8     | 9,498  |
| 20 | 32090     | Warehouse                           | 1.6            | 9.8  | 24,580 | 60      | 0.7                | 3.6  | 8,968  | 60      | 6.2     | 15,613 |
| 21 | 32100     | Elect/Comm. Calibration             | 2.4            | 25.0 | 62,470 | 138     | 1.0                | 10.1 | 25,300 | 135     | 14.9    | 37,170 |
| 22 | 32130     | Ammo Quality Assurance              | 2.8            | 8.4  | 21,095 | 52      | 1.0                | 3.2  | 7,893  | 51      | 5.3     | 13,203 |
| 23 | 32150     | Ammo Quality Assurance              | 1.6            | 2.0  | 4,980  | 24      | 1.1                | 1.4  | 3,540  | 24      | 0.6     | 1,440  |
| 24 | 33060     | Boiler & Compressor House           | 0.3            | 1.5  | 3,640  | 10      | 0.2                | 1.0  | 2,507  | 10      | 0.5     | 1,133  |
| 25 | 33530     | Fill and Press (payout areas only)  | 2.4            | 17.1 | 42,713 | 83      | 0.6                | 4.3  | 10,768 | 73      | 12.8    | 31,945 |

Table 3-1. Energy Analysis Summary

Page 2 of 2

|    | Bldg. No. | Function                        | Present System |       |           |         | Replacement System |       |         |         | Savings |         |
|----|-----------|---------------------------------|----------------|-------|-----------|---------|--------------------|-------|---------|---------|---------|---------|
|    |           |                                 | W/SF           | kW    | kWh/yr    | # Fixt. | W/SF               | kW    | kWh/yr  | # Fixt. | kW      | kWh/yr  |
| 26 | 34110     | WP Filling                      | 0.6            | 50.9  | 127,335   | 589     | 0.4                | 34.7  | 86,850  | 589     | 16.2    | 40,485  |
| 27 | 34120     | Ammo Quality (south end only)   | 2.1            | 11.5  | 28,690    | 76      | 0.8                | 4.1   | 10,205  | 61      | 7.4     | 18,485  |
| 28 | 34140     | Boiler & Compressor House       | 1.8            | 3.8   | 9,433     | 26      | 1.0                | 2.1   | 5,213   | 25      | 1.7     | 4,220   |
| 29 | 34910     | Admin/FE Maint. Shop            | 2.1            | 114.5 | 286,220   | 507     | 0.9                | 41.9  | 104,640 | 500     | 72.6    | 181,580 |
| 30 | 34970     | Administration                  | 3.0            | 5.7   | 14,360    | 42      | 1.0                | 2.0   | 4,890   | 34      | 3.8     | 9,470   |
| 31 | 44100     | Production Field Office         | 1.4            | 34.6  | 86,613    | 300     | 0.6                | 15.0  | 37,620  | 259     | 19.6    | 48,993  |
| 32 | 51420     | Offices/DMMD                    | 2.8            | 20.8  | 52,060    | 134     | 1.0                | 7.0   | 17,405  | 118     | 13.9    | 34,655  |
| 33 | 51430     | Engineering Administration      | 2.7            | 4.5   | 11,330    | 33      | 1.2                | 1.9   | 4,838   | 29      | 2.6     | 6,493   |
| 34 | 53160     | Chemical Administration         | 2.0            | 7.7   | 19,268    | 60      | 0.9                | 3.4   | 8,385   | 60      | 4.4     | 10,883  |
| 35 | 60020     | Security                        | 0.9            | 7.8   | 19,515    | 58      | 0.4                | 3.6   | 9,030   | 58      | 4.2     | 10,485  |
| 36 | 60060     | Administration                  | 2.2            | 7.6   | 19,123    | 51      | 0.9                | 3.0   | 7,428   | 51      | 4.7     | 11,695  |
| 37 | 60070     | Fixed Laundry                   | 1.7            | 8.3   | 20,865    | 76      | 1.0                | 4.8   | 12,033  | 77      | 3.5     | 8,833   |
| 38 | 60090     | TC Administration               | 3.3            | 6.0   | 15,120    | 34      | 1.0                | 1.9   | 4,668   | 33      | 4.2     | 10,453  |
| 39 | 60630     | Warehouse                       | 0.7            | 6.2   | 15,458    | 39      | 0.6                | 5.1   | 12,668  | 45      | 1.1     | 2,790   |
| 40 | 63100     | Chemical Field Maint. Shop      | 1.6            | 14.1  | 35,203    | 103     | 0.8                | 7.0   | 17,595  | 87      | 7.0     | 17,608  |
| 41 | 63110     | Chemical Maint. shop            | 1.4            | 14.1  | 35,148    | 80      | 0.5                | 5.1   | 12,650  | 76      | 9.0     | 22,498  |
| 42 | 63120     | Chemical Field Maint. Shop      | 0.9            | 10.2  | 25,535    | 56      | 0.8                | 8.5   | 21,165  | 55      | 1.7     | 4,370   |
| 43 | 63200     | Chemical Field Maint. Shop      | 1.4            | 16.5  | 41,315    | 104     | 0.8                | 9.4   | 23,400  | 104     | 7.2     | 17,915  |
| 44 | 63210     | Mask Repair                     | 1.0            | 11.3  | 28,220    | 103     | 0.7                | 7.8   | 19,383  | 88      | 3.5     | 8,838   |
| 45 | 63410     | Toxic/Conventional Change House | 1.0            | 7.6   | 19,115    | 168     | 0.8                | 5.9   | 14,685  | 163     | 1.8     | 4,430   |
|    |           | TOTALS                          | 1.2            | 564.6 | 1,411,618 | 4,110   | 0.6                | 270.8 | 676,925 | 3,928   | 293.9   | 734,693 |

#### 4.0 REEVALUATED PROJECTS RESULTS

The reevaluation of previous energy-related projects was not included in the Scope of Work.

## 5.0 ENERGY ANALYSIS

### 5.1 Energy Conservation Opportunity (ECO) Evaluations

Each of the ECOs listed in the Scope of Work were reviewed for their applicability and potential for significant energy savings and cost effectiveness and are listed in Table 5-1.

For each of the evaluated ECOs, energy savings were calculated, cost estimates made and Life Cycle Cost (LCC) Analyses performed. A listing of evaluated ECOs along with a summary of the energy and cost savings analysis is shown in Table 5-2. Several investigations were made as part of ECO Number 1.

TABLE 5-1 ECOs EVALUATED

|     | <u>Investigation</u>  | <u>Evaluation</u> |
|-----|---|-------------------|
| 1.  | Remove unneeded lamps or fixtures.  | ECO 1             |
| 2.  | Reduce indoor lighting where illumination exceeds AEI recommended levels. | ECO 1             |
| 3.  | Increase daylighting.   | ECO 2             |
| 4.  | Lower light fixtures.   | ECO 1             |
| 5.  | Improve reflection and dispersion with light-colored ceiling and walls    | ECO 3             |
| 6.  | Install occupancy sensors.  | ECO 4             |
| 7.  | Install photocells to lighting near windows                               | ECO 5             |
| 8.  | Install additional switches to control lighting arrangements.             | ECO 6             |
| 9.  | Use time clocks to shut off exterior building lights.                     | ECO 7             |
| 10. | Replace incandescent lamps with compact fluorescent lamps.                | ECO 1             |
| 11. | Replace incandescent exit sign fixtures with LED fixtures.                | ECO 8             |
| 12. | Replace incandescent lamps in exit signs with compact fluorescent lamps.  | ECO 8             |
| 13. | Replace standard fluorescent lamps with energy-conserving lamps.          | ECO 1             |

- |     |   |       |
|-----|---|-------|
| 14. | Replace standard fluorescent ballasts with electronic ballasts  | ECO 1 |
| 15. | Replace existing fluorescent fixtures with new fixtures having efficient reflectors, electronic ballasts, and energy-conserving lamps                         | ECO 1 |
| 16. | Use more efficient lighting source, i.e., upgrade from incandescent to fluorescent, from fluorescent to HID, from mercury vapor to high-pressure sodium, etc. | ECO 1 |

TABLE 5-2 ECO EVALUATIONS - RESULTS

| ECO    | PROJECT NAME                        | TOTAL<br>CONSTRUCTION<br>COST | SAVINGS,<br>MBtu/Yr<br>ELECTRICITY | NET ANNUAL<br>COST SAVINGS | SIR | SIMPLE<br>PAYBACK<br>(YEARS) |
|--------|-------------------------------------|-------------------------------|------------------------------------|----------------------------|-----|------------------------------|
| 1      | Upgrade or Replace Lighting         | \$353,750                     | 2,508                              | \$50,490                   | 1.8 | 6.7                          |
| 2      | Increase Daylighting                | --                            | --                                 | --                         | --  | --                           |
| 3      | Light-Colored Ceilings and<br>Walls | --                            | --                                 | --                         | --  | --                           |
| 4      | Install Occupancy Sensors           | \$14,020                      | 580                                | \$11,700                   | 7.9 | 1.5                          |
| 5      | Install Photocells                  | --                            | --                                 | --                         | --  | 34.0                         |
| 6      | Install Additional Switching        | --                            | --                                 | --                         | --  | --                           |
| 7      | Install Time Clocks                 | --                            | --                                 | --                         | --  | --                           |
| 8      | LED Exit Signs                      | \$2,450                       | 46                                 | \$930                      | 4.6 | 2.6                          |
| TOTALS |                                     | \$370,220                     | 3,134                              | \$63,120                   | 2.0 | 5.9                          |

## ECO Number 1

### UPGRADE OR REPLACE LIGHTING

#### Discussion

As shown in Table 5-1, several investigations for energy conservation opportunities were combined into one ECO. Data were taken in each room of each of the 45 surveyed buildings to determine the type and condition of the existing luminaires, representative illumination levels (footcandles) representative types of lamps and ballasts, the room dimensions, the height and location of the fixtures, and the type and accessibility of switching. Notations were done on RS&H-provided data forms, and photographs were taken where allowed by security. Drawings were provided by the Arsenal's Engineering Plans and Services and were also used to note fixture positions. Fixture positions in each room were input to the analysis program.

A PC-based computer program, "Lite-Pro," provided by USI Lighting Company, was used to analyze the illumination levels point-by-point and the unit power density within each room. The program also keeps track of the number of fixtures, by type, for each building and each room.

Initially, analyses were done for the existing luminaires. Although the photometric data base of Lite-Pro is extensive, it was not possible to match existing fixtures exactly to the data base because of lack of manufacturers names and model numbers. Fixture types were noted during the site survey, however, and similar fixtures were selected for analysis. Calculated illuminance levels were reasonably close to those noted on the site survey data sheets, given the wide range of conditions and lifetimes of the existing fixtures.

Point-by-point analysis was then done for each room with the following criteria:

- 1) Illuminance levels were to be brought into line with AEI recommendations. In many cases, present levels are too high.
- 2) T8 lamps and electronic ballasts would replace existing T12 lamps and electromagnetic ballasts, including energy-saving lamps and



ballasts already in place. The T12 and electromagnetic-technologies should be phased out and the T8 technology adopted installationwide.

- 3) Existing fixtures would be used where possible. If illuminance levels were reduced, lamps would be removed; reflectors would be installed if necessary to meet AEI footcandle (FC) recommendations. Fixtures would be moved if practical and necessary.
- 4) Higher-efficiency fixtures would replace low-efficiency fixtures where practical.
- 5) Compact fluorescent lamps would replace incandescent lamps where practical. Exceptions were made for fixtures with low utilization (e.g., janitors' closets).
- 6) Excessive fixtures would be removed where necessary.

Table 5-3 shows a summary of the changes made by building based on analysis result. In all:

- 1) 843 fixtures are removed, and 641 installed. The installed fixtures are various energy-efficient types, and include compact fluorescent replacement of incandescent lamps. All new fixtures employ T8 technology.
- 2) 3,109 fixtures are changed (upgraded); 8,776 lamps and 4,475 ballasts are removed, and 6,464 T8 lamps and 3,109 electronic ballasts installed; 270 reflectors are also installed in existing fixtures.

Table 3-1 (See Section 3.3) is a summarization of the energy analysis results, by building. The table shows comparisons between the existing lighting systems and the proposed replacements:

- 1) Average unit power density for the 45 buildings will be reduced from 1.2 W/sf to 0.6 W/sf.
- 2) Total luminaire wattage will be reduced from 565 kW to 271 kW.

Table 5-3. Fixture Changeout Summary

|    | Bldg. No. | Function                            | Fixtures<br>Removed | Fixtures<br>Installed | Fixtures<br>Upgraded | Reflectors<br>Installed | T12 Lamps<br>Removed | EM Blsts<br>Removed | T8 Lamps<br>Installed | El. Blsts<br>Installed |
|----|-----------|-------------------------------------|---------------------|-----------------------|----------------------|-------------------------|----------------------|---------------------|-----------------------|------------------------|
| 1  | 10020     | Administration                      | 169                 | 149                   | 44                   | 40                      | 164                  | 84                  | 88                    | 44                     |
| 2  | 10030     | Admin General Purpose               | 4                   | 2                     | 67                   | 21                      | 224                  | 112                 | 155                   | 67                     |
| 3  | 10050     | Fire HQ                             | 6                   | 4                     | 46                   | 17                      | 126                  | 63                  | 92                    | 46                     |
| 4  | 13010     | Community Services                  | 0                   | 0                     | 28                   | 2                       | 104                  | 52                  | 56                    | 28                     |
| 5  | 13020     | Health Clinic                       | 12                  | 11                    | 34                   | 13                      | 90                   | 45                  | 76                    | 34                     |
| 6  | 13030     | 52nd EOD                            | 0                   | 0                     | 25                   | 7                       | 84                   | 42                  | 74                    | 25                     |
| 7  | 13040     | Counseling Facility                 | 5                   | 1                     | 26                   | 0                       | 52                   | 26                  | 52                    | 26                     |
| 8  | 13060     | Clinic                              | 3                   | 0                     | 17                   | 5                       | 68                   | 34                  | 34                    | 17                     |
| 9  | 13080     | Laboratory                          | 21                  | 21                    | 2                    | 0                       | 8                    | 4                   | 8                     | 2                      |
| 10 | 13100     | Infirmary                           | 2                   | 2                     | 15                   | 0                       | 38                   | 19                  | 36                    | 15                     |
| 11 | 13110     | Audio-Visual Facility               | 5                   | 1                     | 29                   | 0                       | 84                   | 42                  | 68                    | 29                     |
| 12 | 16210     | Barracks (halls, showers, latrines) | 8                   | 3                     | 15                   | 0                       | 24                   | 15                  | 24                    | 15                     |
| 13 | 16220     | Barracks (halls, showers, latrines) | 8                   | 3                     | 15                   | 0                       | 24                   | 15                  | 24                    | 15                     |
| 14 | 31010     | Electronic Calibration              | 0                   | 0                     | 6                    | 0                       | 24                   | 12                  | 24                    | 6                      |
| 15 | 31080     | Electronic Calibration              | 0                   | 0                     | 24                   | 0                       | 90                   | 45                  | 68                    | 24                     |
| 16 | 32030     | Inspection Garage                   | 15                  | 22                    | 4                    | 0                       | 8                    | 4                   | 8                     | 4                      |
| 17 | 32035     | Ordinance Shop                      | 0                   | 0                     | 252                  | 0                       | 504                  | 252                 | 504                   | 252                    |
| 18 | 32060     | Boiler & Compressor House           | 0                   | 0                     | 9                    | 0                       | 21                   | 12                  | 21                    | 9                      |
| 19 | 32070     | Impreg. & Laundry                   | 1                   | 0                     | 103                  | 0                       | 212                  | 106                 | 212                   | 103                    |
| 20 | 32090     | Warehouse                           | 0                   | 0                     | 60                   | 24                      | 240                  | 120                 | 122                   | 60                     |
| 21 | 32100     | Elect/Comm. Calibration             | 3                   | 0                     | 135                  | 3                       | 464                  | 232                 | 282                   | 135                    |
| 22 | 32130     | Ammo Quality Assurance              | 3                   | 2                     | 49                   | 48                      | 194                  | 97                  | 98                    | 49                     |
| 23 | 32150     | Ammo Quality Assurance              | 0                   | 0                     | 24                   | 4                       | 48                   | 24                  | 48                    | 24                     |
| 24 | 33060     | Boiler & Compressor House           | 0                   | 0                     | 9                    | 0                       | 21                   | 12                  | 21                    | 9                      |
| 25 | 33530     | Fill and Press (packout areas only) | 83                  | 73                    | 0                    | 0                       | 0                    | 0                   | 0                     | 0                      |
| 26 | 34110     | WP Filling                          | 0                   | 0                     | 589                  | 0                       | 1,218                | 609                 | 1,178                 | 589                    |
| 27 | 34120     | Ammo Quality (south end only)       | 36                  | 21                    | 40                   | 14                      | 111                  | 73                  | 94                    | 40                     |
| 28 | 34140     | Boiler & Compressor House           | 16                  | 15                    | 10                   | 0                       | 20                   | 10                  | 20                    | 10                     |
| 29 | 34910     | Admin/FE Maint. Shop                | 88                  | 81                    | 412                  | 8                       | 1,427                | 715                 | 846                   | 412                    |
| 30 | 34970     | Administration                      | 12                  | 4                     | 28                   | 0                       | 96                   | 48                  | 56                    | 28                     |
| 31 | 44100     | Production Field Office             | 70                  | 29                    | 218                  | 5                       | 631                  | 344                 | 436                   | 218                    |
| 32 | 51420     | Offices/DMMD                        | 16                  | 0                     | 118                  | 0                       | 452                  | 227                 | 236                   | 118                    |
| 33 | 51430     | Engineering Administration          | 8                   | 4                     | 25                   | 0                       | 82                   | 41                  | 50                    | 25                     |
| 34 | 53160     | Chemical Administration             | 5                   | 5                     | 55                   | 4                       | 178                  | 89                  | 110                   | 55                     |
| 35 | 60020     | Security                            | 26                  | 24                    | 32                   | 4                       | 106                  | 53                  | 66                    | 32                     |
| 36 | 60060     | Administration                      | 3                   | 3                     | 46                   | 35                      | 178                  | 89                  | 92                    | 46                     |
| 37 | 60070     | Fixed Laundry                       | 16                  | 17                    | 60                   | 0                       | 126                  | 63                  | 122                   | 60                     |
| 38 | 60090     | TC Administration                   | 34                  | 33                    | 0                    | 0                       | 0                    | 0                   | 0                     | 0                      |
| 39 | 60630     | Warehouse                           | 10                  | 16                    | 11                   | 0                       | 26                   | 13                  | 22                    | 11                     |
| 40 | 63100     | Chemical Field Maint. Shop          | 16                  | 0                     | 87                   | 2                       | 240                  | 120                 | 174                   | 87                     |
| 41 | 63110     | Chemical Maint. shop                | 4                   | 0                     | 75                   | 0                       | 290                  | 145                 | 156                   | 75                     |
| 42 | 63120     | Chemical Field Maint. Shop          | 3                   | 2                     | 21                   | 0                       | 56                   | 28                  | 42                    | 21                     |
| 43 | 63200     | Chemical Field Maint. Shop          | 0                   | 0                     | 104                  | 14                      | 398                  | 199                 | 344                   | 104                    |
| 44 | 63210     | Mask Repair                         | 15                  | 0                     | 85                   | 0                       | 170                  | 85                  | 170                   | 85                     |
| 45 | 63410     | Toxic/Conventional Change House     | 97                  | 93                    | 55                   | 0                       | 55                   | 55                  | 55                    | 55                     |
|    |           | TOTALS                              | 823                 | 641                   | 3,109                | 270                     | 8,776                | 4,475               | 6,464                 | 3,109                  |

- 3) Annual energy use, assuming 2,500 hours per year average use per fixture, will be reduced from approximately 1,411,620 kWh/yr to 676,925 kWh/yr.

### Recommendations

The life-cycle cost analysis program, LCCID 1.092, was used to determine the costs/benefits of the fixtures replacement. Based on the energy savings to Pine Bluff Arsenal, it is recommended that the project be implemented. The ECO showed the following costs/benefits:

|                             |           |
|-----------------------------|-----------|
| Construction Costs (\$)     | \$353,750 |
| Energy Savings (MBtu/yr)    |           |
| Electricity                 | 2,508     |
| Energy Cost Savings (\$/yr) | 50,500    |
| SIR                         | 1.8       |
| Simple Payback (years)      | 6.7       |

Energy cost savings include the savings from the reduction in A/C loads (estimated at \$2,600 per year). Economic life of the project was assumed to be 15 years.

LIFE CYCLE COST ANALYSIS SUMMARY  
 ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: PBA01  
 INSTALLATION & LOCATION: PINE BLUFF ARS REGION NOS. 6 CENSUS: 3 LCCID FY95 (92)  
 PROJECT NO. & TITLE: 1 LIGHTING STUDY  
 FISCAL YEAR 95 DISCRETE PORTION NAME: LIGHTING  
 ANALYSIS DATE: 03-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: C. WARREN

1. INVESTMENT  
 A. CONSTRUCTION COST \$ 315851.  
 B. SIOH \$ 18951.  
 C. DESIGN COST \$ 18951.  
 D. TOTAL COST (1A+1B+1C) \$ 353753.  
 E. SALVAGE VALUE OF EXISTING EQUIPMENT \$ 0.  
 F. PUBLIC UTILITY COMPANY REBATE \$ 0.  
 G. TOTAL INVESTMENT (1D - 1E - 1F) \$ 353753.

2. ENERGY SAVINGS (+) / COST (-)  
 DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994  

| FUEL              | UNIT COST<br>\$/MBTU(1) | SAVINGS<br>MBTU/YR(2) | ANNUAL \$<br>SAVINGS(3) | DISCOUNT<br>FACTOR(4) | DISCOUNTED<br>SAVINGS(5) |
|-------------------|-------------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| A. ELECT          | \$ 20.13                | 2508.                 | \$ 50486.               | 12.02                 | \$ 606842.               |
| B. DIST           | \$ .00                  | 0.                    | \$ 0.                   | 14.23                 | \$ 0.                    |
| C. RESID          | \$ .00                  | 0.                    | \$ 0.                   | 15.87                 | \$ 0.                    |
| D. NAT G          | \$ .00                  | 0.                    | \$ 0.                   | 14.17                 | \$ 0.                    |
| E. COAL           | \$ .00                  | 0.                    | \$ 0.                   | 13.28                 | \$ 0.                    |
| F. PPG            | \$ .00                  | 0.                    | \$ 0.                   | 13.49                 | \$ 0.                    |
| M. DEMAND SAVINGS |                         |                       | \$ 0.                   | 11.94                 | \$ 0.                    |
| N. TOTAL          |                         | 2508.                 | \$ 50486.               |                       | \$ 606842.               |

3. NON ENERGY SAVINGS(+) / COST(-)  
 A. ANNUAL RECURRING (+/-)  
 (1) DISCOUNT FACTOR (TABLE A) 11.94  
 (2) DISCOUNTED SAVING/COST (3A X 3A1) \$ 26614.

B. NON RECURRING SAVINGS(+) / COSTS(-)  

| ITEM     | SAVINGS(+)<br>COST(-)<br>(1) | YR<br>OC<br>(2) | DISCNT<br>FACTR<br>(3) | DISCOUNTED<br>SAVINGS(+)/<br>COST(-)(4) |
|----------|------------------------------|-----------------|------------------------|---|
| d. TOTAL | \$ 0.                        |                 |                        | 0.                                      |

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 26614.

4. FIRST YEAR DOLLAR SAVINGS  $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$  \$ 52715.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.71 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 633456.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 1.79  
 (IF < 1 PROJECT DOES NOT QUALIFY)

ECO Number 2

INCREASE DAYLIGHTING

Discussion

No opportunities were observed to cost-effectively increase daylighting to accomplish energy savings.

Recommendations

This ECO is not recommended.

### ECO Number 3

#### LIGHT-COLORED CEILINGS AND WALLS

##### Discussion

The use of light-colored ceilings and walls are a means of increasing the reflectance of light fixtures. However, point-by-point calculations show only marginal increases from light-colored walls compared to increasing the fixture's efficiency.

##### Recommendations

It is not recommended to re-paint or install new ceilings based on energy savings. Whenever painting is done as a part of building maintenance, use of light-colored paints are recommended.

## ECO Number 4

### OCCUPANCY SENSORS

#### Discussion

The site survey revealed that lights were on in many unoccupied areas. Candidates for occupancy sensors are restrooms, breakrooms, conference rooms and offices. Screening calculations showed that occupancy sensors in restrooms and breakrooms offer potential simple paybacks within the ten-year limitation.

#### Recommendations

The LCC analysis program, LCCID 1.092, was used to determine the costs/benefits of the installation of occupancy sensors. A 15-year economic life was used, and an electricity price of \$0.0687/kWh. Based on the energy savings to Pine Bluff Arsenal, it is recommended that the project be implemented. The ECO showed the following costs/benefits:

|                             |          |
|-----------------------------|----------|
| Construction Costs (\$)     | \$14,019 |
| Energy Savings (MBtu/yr)    |          |
| Electricity                 | 581      |
| Energy Cost Savings (\$/yr) | 11,700   |
| SIR                         | 7.9      |
| Simple Payback (years)      | 1.5      |

LIFE CYCLE COST ANALYSIS SUMMARY  
 ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: PBA01  
 INSTALLATION & LOCATION: PINE BLUFF ARS REGION NOS. 6 LCCID FY95 (92)  
 PROJECT NO. & TITLE: 1 LIGHTING STUDY CENSUS: 3  
 FISCAL YEAR 95 DISCRETE PORTION NAME: OCCUPANCY SENSORS  
 ANALYSIS DATE: 03-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: C. WARREN

1. INVESTMENT

|  |    |        |        |  |
|--|----|--------|--------|--|
| A. CONSTRUCTION COST                   | \$ | 12517. |        |  |
| B. SIOH                                | \$ | 751.   |        |  |
| C. DESIGN COST                         | \$ | 751.   |        |  |
| D. TOTAL COST (1A+1B+1C)               | \$ | 14019. |        |  |
| E. SALVAGE VALUE OF EXISTING EQUIPMENT | \$ | 0.     |        |  |
| F. PUBLIC UTILITY COMPANY REBATE       | \$ | 0.     |        |  |
| G. TOTAL INVESTMENT (1D - 1E - 1F)     | \$ |        | 14019. |  |

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

| FUEL              | UNIT COST<br>\$/MBTU(1) | SAVINGS<br>MBTU/YR(2) | ANNUAL \$<br>SAVINGS(3) | DISCOUNT<br>FACTOR(4) | DISCOUNTED<br>SAVINGS(5) |
|-------------------|-------------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| A. ELECT          | \$ 20.13                | 581.                  | \$ 11700.               | 12.02                 | \$ 140629.               |
| B. DIST           | \$ .00                  | 0.                    | \$ 0.                   | 14.23                 | \$ 0.                    |
| C. RESID          | \$ .00                  | 0.                    | \$ 0.                   | 15.87                 | \$ 0.                    |
| D. NAT G          | \$ .00                  | 0.                    | \$ 0.                   | 14.17                 | \$ 0.                    |
| E. COAL           | \$ .00                  | 0.                    | \$ 0.                   | 13.28                 | \$ 0.                    |
| F. PPG            | \$ .00                  | 0.                    | \$ 0.                   | 13.49                 | \$ 0.                    |
| M. DEMAND SAVINGS |                         |                       | \$ 0.                   | 11.94                 | \$ 0.                    |
| N. TOTAL          |                         | 581.                  | \$ 11700.               |                       | \$ 140629.               |

3. NON ENERGY SAVINGS(+) / COST(-)

|                                       |       |            |
|---------------------------------------|-------|------------|
| A. ANNUAL RECURRING (+/-)             |       | \$ -2462.  |
| (1) DISCOUNT FACTOR (TABLE A)         | 11.94 |            |
| (2) DISCOUNTED SAVING/COST (3A X 3A1) |       | \$ -29396. |

B. NON RECURRING SAVINGS(+) / COSTS(-)

| ITEM     | SAVINGS(+)<br>COST(-)<br>(1) | YR<br>OC<br>(2) | DISCNT<br>FACTR<br>(3) | DISCOUNTED<br>SAVINGS(+)/<br>COST(-)(4) |
|----------|------------------------------|-----------------|------------------------|---|
| d. TOTAL | \$ 0.                        |                 |                        | 0.                                      |

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)\$ -29396.

4. FIRST YEAR DOLLAR SAVINGS  $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 9238.

5. SIMPLE PAYBACK PERIOD (1G/4) 1.52 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 111232.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 7.93  
 (IF < 1 PROJECT DOES NOT QUALIFY)



## ECO Number 5

### INSTALL PHOTOCELLS

#### Discussion

Screening calculations for this ECO showed that the measure would not be cost effective. The costs of controls, the sensor, and dimming ballasts make the simple payback in excess of 30 years for a typical south-facing office with windows (having four, two-lamp T-8 fixtures).

#### Recommendations

Based on costs/benefits, this ECO is not recommended.

ECO Number 6

INSTALL ADDITIONAL SWITCHING

Discussion

Most areas observed had adequate and available switching. Opportunities for this ECO are limited.

Recommendations

This ECO is not recommended for implementation.

ECO Number 7

INSTALL TIME CLOCKS FOR EXTERIOR BUILDING LIGHTS

Discussion

Virtually all exterior lights of the 45 buildings were off during daylight hours, as observed during the survey.

Recommendations

This ECO is not needed and is not recommended. Education of building occupants is the most effective measure.

## ECO Number 8

### LED EXIT SIGN LAMPS

#### Discussion

The majority of exit signs in the 45 surveyed buildings contain two, 15-watt incandescent lamps. LED lamps are a low-cost, energy-efficient retrofit. It was noted that many exit signs are burned out, and many exits do not have signs.

A survey of the drawings show that there are a total of approximately 225 exits in the 45 buildings. Ten of the exits have radioactive signs, and 55 have existing signs. This project is for retrofits of the 55 signs, only.

#### Recommendations

Based on the cost/benefits to Pine Bluff Arsenal, it is recommended that ECO Number 8 be implemented. The ECO shows the following costs/benefits:

|                             |         |
|-----------------------------|---------|
| Construction Costs (\$)     | \$2,454 |
| Energy Savings (MBtu/yr)    |         |
| Electricity                 | 46      |
| Energy Cost Savings (\$/yr) | 932     |
| SIR                         | 4.6     |
| Simple Payback (years)      | 2.6     |

LIFE CYCLE COST ANALYSIS SUMMARY  
 ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: PBA01  
 LCCID FY95 (92)  
 INSTALLATION & LOCATION: PINE BLUFF ARS REGION NOS. 6 CENSUS: 3  
 PROJECT NO. & TITLE: 1 LIGHTING STUDY  
 FISCAL YEAR 95 DISCRETE PORTION NAME: LED EXIT SIGNS  
 ANALYSIS DATE: 03-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: C. WARREN

1. INVESTMENT

|  |    |       |  |
|--|----|-------|--|
| A. CONSTRUCTION COST                   | \$ | 2190. |  |
| B. SIOH                                | \$ | 132.  |  |
| C. DESIGN COST                         | \$ | 132.  |  |
| D. TOTAL COST (1A+1B+1C)               | \$ | 2454. |  |
| E. SALVAGE VALUE OF EXISTING EQUIPMENT | \$ | 0.    |  |
| F. PUBLIC UTILITY COMPANY REBATE       | \$ | 0.    |  |
| G. TOTAL INVESTMENT (1D - 1E - 1F)     | \$ | 2454. |  |

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

| FUEL              | UNIT COST<br>\$/MBTU(1) | SAVINGS<br>MBTU/YR(2) | ANNUAL \$<br>SAVINGS(3) | DISCOUNT<br>FACTOR(4) | DISCOUNTED<br>SAVINGS(5) |
|-------------------|-------------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| A. ELECT          | \$ 20.13                | 46.                   | \$ 932.                 | 12.02                 | \$ 11203.                |
| B. DIST           | \$ .00                  | 0.                    | \$ 0.                   | 14.23                 | \$ 0.                    |
| C. RESID          | \$ .00                  | 0.                    | \$ 0.                   | 15.87                 | \$ 0.                    |
| D. NAT G          | \$ .00                  | 0.                    | \$ 0.                   | 14.17                 | \$ 0.                    |
| E. COAL           | \$ .00                  | 0.                    | \$ 0.                   | 13.28                 | \$ 0.                    |
| F. PPG            | \$ .00                  | 0.                    | \$ 0.                   | 13.49                 | \$ 0.                    |
| M. DEMAND SAVINGS |                         |                       | \$ 0.                   | 11.94                 | \$ 0.                    |
| N. TOTAL          |                         | 46.                   | \$ 932.                 |                       | \$ 11203.                |

3. NON ENERGY SAVINGS(+) / COST(-)

|                                       |  |       |    |
|---------------------------------------|--|-------|----|
| A. ANNUAL RECURRING (+/-)             |  | \$    | 0. |
| (1) DISCOUNT FACTOR (TABLE A)         |  | 11.94 |    |
| (2) DISCOUNTED SAVING/COST (3A X 3A1) |  | \$    | 0. |

B. NON RECURRING SAVINGS(+) / COSTS(-)

| ITEM     | SAVINGS(+)<br>COST(-)<br>(1) | YR<br>OC<br>(2) | DISCNT<br>FACTR<br>(3) | DISCOUNTED<br>SAVINGS(+)/<br>COST(-)(4) |
|----------|------------------------------|-----------------|------------------------|---|
| d. TOTAL | \$ 0.                        |                 |                        | 0.                                      |

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)\$ 0.

4. FIRST YEAR DOLLAR SAVINGS  $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 932.

5. SIMPLE PAYBACK PERIOD (1G/4) 2.63 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 11203.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 4.57  
 (IF < 1 PROJECT DOES NOT QUALIFY)

## 5.2 Multiple ECO Project Evaluations

ECIP Number 1

### LIGHTING RETROFITS

#### Discussion

This project combines ECOs as listed below:

| <u>ECO #</u> | <u>ECO Description</u>      |
|--------------|-----------------------------|
| 1            | Upgrade or Replace Lighting |
| 4            | Occupancy Sensors           |
| 8            | LED Exit Sign Retrofits     |

Detailed discussions are contained in the previous section (5.1).

#### Recommendations

The life-cycle cost analysis program LCCID 1.092, was used to determine the cost/benefits of this ECIP. Based on the energy savings to Pine Bluff Arsenal, it is recommended. The results are summarized below.

|                                      |           |
|--------------------------------------|-----------|
| Construction Cost                    | \$370,226 |
| Annual Energy Savings (MBtu/year)    |           |
| Electricity                          | 3,135     |
| Annual Energy Cost Savings (\$/year) | \$63,108  |
| SIR                                  | 2.0       |
| Simple Payback (years)               | 5.9       |

LIFE CYCLE COST ANALYSIS SUMMARY  
 ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: PBA01  
 INSTALLATION & LOCATION: PINE BLUFF ARSREGION NOS. 6 CENSUS: 3 LCCID FY95 (92)  
 PROJECT NO. & TITLE: 1 LIGHTING STUDY  
 FISCAL YEAR 95 DISCRETE PORTION NAME: TOTAL  
 ANALYSIS DATE: 03-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: C. WARREN

1. INVESTMENT  
 A. CONSTRUCTION COST \$ 330558.  
 B. SIOH \$ 19834.  
 C. DESIGN COST \$ 19834.  
 D. TOTAL COST (1A+1B+1C) \$ 370226.  
 E. SALVAGE VALUE OF EXISTING EQUIPMENT \$ 0.  
 F. PUBLIC UTILITY COMPANY REBATE \$ 0.  
 G. TOTAL INVESTMENT (1D - 1E - 1F) \$ 370226.

2. ENERGY SAVINGS (+) / COST (-)  
 DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994  

| FUEL              | UNIT COST<br>\$/MBTU(1) | SAVINGS<br>MBTU/YR(2) | ANNUAL \$<br>SAVINGS(3) | DISCOUNT<br>FACTOR(4) | DISCOUNTED<br>SAVINGS(5) |
|-------------------|-------------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| A. ELECT          | \$ 20.13                | 3135.                 | \$ 63108.               | 12.02                 | \$ 758553.               |
| B. DIST           | \$ .00                  | 0.                    | \$ 0.                   | 14.23                 | \$ 0.                    |
| C. RESID          | \$ .00                  | 0.                    | \$ 0.                   | 15.87                 | \$ 0.                    |
| D. NAT G          | \$ .00                  | 0.                    | \$ 0.                   | 14.17                 | \$ 0.                    |
| E. COAL           | \$ .00                  | 0.                    | \$ 0.                   | 13.28                 | \$ 0.                    |
| F. PPG            | \$ .00                  | 0.                    | \$ 0.                   | 13.49                 | \$ 0.                    |
| M. DEMAND SAVINGS |                         |                       | \$ 0.                   | 11.94                 | \$ 0.                    |
| N. TOTAL          |                         | 3135.                 | \$ 63108.               |                       | \$ 758553.               |

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)  
 (1) DISCOUNT FACTOR (TABLE A) 11.94  
 (2) DISCOUNTED SAVING/COST (3A X 3A1) \$ -2782.

B. NON RECURRING SAVINGS(+) / COSTS(-)  

| ITEM     | SAVINGS(+)<br>COST(-)<br>(1) | YR<br>OC<br>(2) | DISCNT<br>FACTR<br>(3) | DISCOUNTED<br>SAVINGS(+)/<br>COST(-)(4) |
|----------|------------------------------|-----------------|------------------------|---|
| d. TOTAL | \$ 0.                        |                 |                        | 0.                                      |

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ -2782.

4. FIRST YEAR DOLLAR SAVINGS  $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$  \$ 62875.

5. SIMPLE PAYBACK PERIOD (1G/4) 5.89 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 755771.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 2.04  
 (IF < 1 PROJECT DOES NOT QUALIFY)

## 6.0 ENERGY AND COST SAVINGS

### 6.1 Project Packaging

The ECOs listed in Table 5-2 are recommended for packaging into a single ECIP project. The guidelines to qualify as an ECIP project are project cost greater than \$300,000, simple payback less than ten years, and SIR greater than 1.25. This project is programmed for FY 96 funding.

### 6.2 Energy and Cost Savings

The implementation of all projects yield a total annual energy savings of 3,135 MBtu and annual cost savings equal to \$62,875, which represents a reduction of 3.6 percent and 4.4 percent, respectively in total electrical energy use and cost when compared to FY 94 values. Lighting energy use in the 45 buildings surveyed will be reduced 52 percent. Based on FY 94 values, the energy use and costs before and after project implementation are shown in the following table and in Figure 6-1:

TABLE 6-1 EFFECTS OF PROJECT IMPLEMENTATION

|                           | <u>BEFORE</u> | <u>AFTER</u> | <u>% REDUCTION</u> |
|---------------------------|---------------|--------------|--------------------|
| Electricity Use (MBtu/yr) | 86,045        | 82,410       | 3.6                |
| Electricity Cost (\$/yr)  | 1,414,909     | 1,352,034    | 4.4                |

Source: ADDS

### 6.3 Project Schedule

The project implementation date is estimated to be FY 96.



# Pine Bluff Arsenal

## Projected Energy Savings

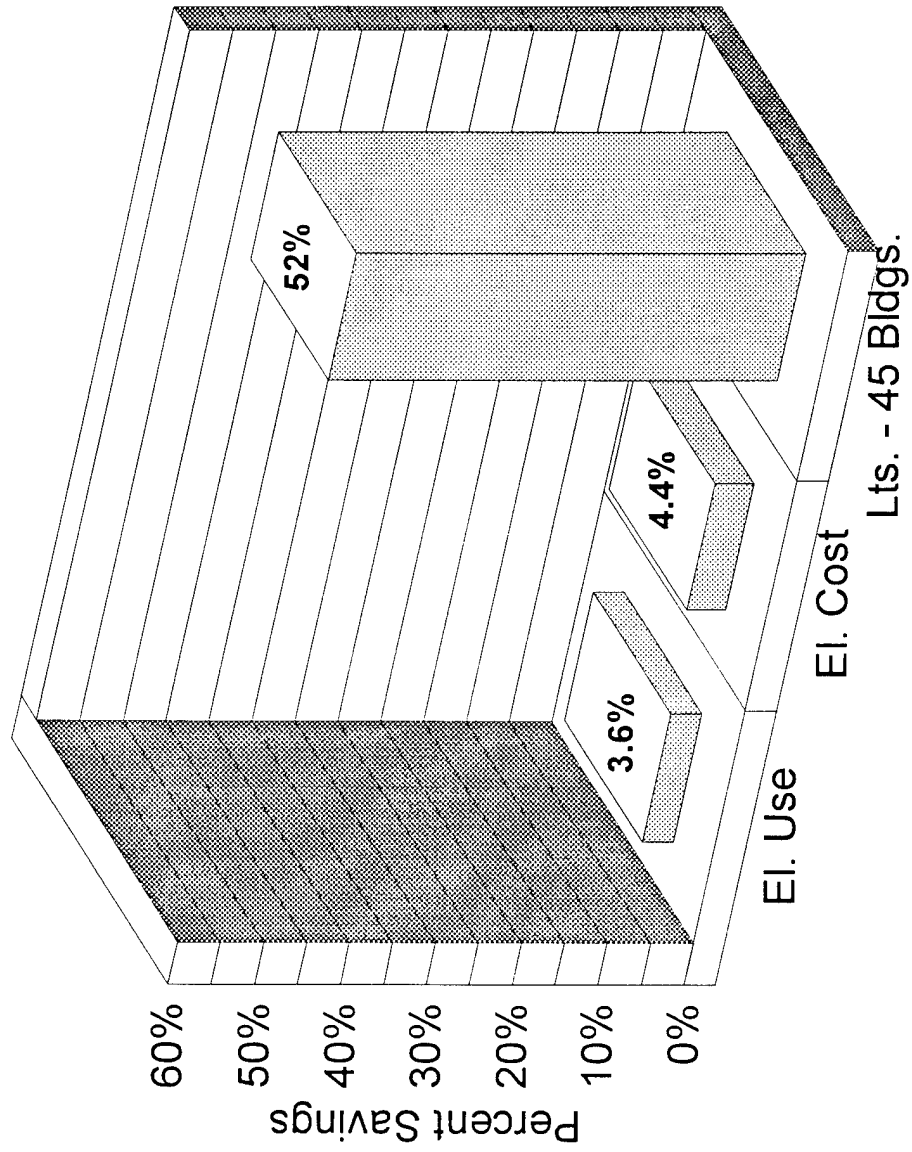


Fig 6-1

## Transmittal Letter

**RS&H**

Architecture, Engineering and Planning

**To:** Commander  
U. S. Army Engineer District, Mobile  
P. O. Box 2288  
Mobile, AL 36628  
Attn: CESAM-EN-CM (Mr. Battaglia)

**Date:** August 16, 1995

**Project:** Lighting Survey, Pine Bluff Arsenal  
Contract DACA01-94-D-0038  
Delivery Order No. 0001

**Project No:** 694-1331-001

**We Transmit:**

☒ herewith  
☐ under separate cover

**For Your:**

☐ approval  
☐ review & comment  
☒ use

**The Following:**

| <b>Copies</b> | <b>Date</b>    | <b>Description</b>                      |
|---------------|----------------|---|
| 1             | 16 August 1995 | Responses to Comments - Final Submittal |

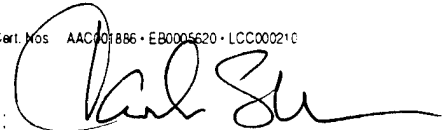
**Remarks:**

**Copies To:**

Reynolds, Smith and Hills, Inc.  
4651 Salisbury Road  
Jacksonville, Florida 32256  
904-296-2000 Fax 904-279-2431

FL Cert. Nos. AAC001886 • EB0005620 • LCC000210

By:



Carlos S. Warren, PhD, PE  
Project Manager

PROJECT: EEAP, LIGHTING STUDY, PINE BLUFF ARSENAL, DACA01-94-D-0038,  
DELIVERY ORDER NO. 0001, AEP NO. 694-1331-001

DATE: 15 AUGUST 1995

RESPONSES TO FINAL SUBMITTAL COMMENTS (EMMERLING)

| <u>CMT#</u> | <u>REF</u>                          | <u>RESPONSE</u>   |
|-------------|-------------------------------------|---|
| 1.          | Vol. I<br>pp 6-3<br>through<br>6-22 | Coefficients of utilization (CU) have been added to tables in Section 6. Pages 6-3 through 6-22 should be removed from Volume I and the enclosed pages 6-3 through 6-21 inserted in their place.  |
| 2.          | Vol. I<br>page 6-2                  | Assumed fixture cleaning intervals of once per year has been added to explanation of proposed LLF. Page 6-2 should be removed and the enclosed page 6-2 inserted in its place.  |
| 3.          | Vol. IV<br>PDB-1,<br>PDB-2          | Disposal of fluorescent lamps was coordinated with PBA DPW. Comments were added to PDB-1, Item E-6 and PDB-2, Item E-1, instructing contractors to coordinate disposal with the PBA Environmental Compliance group. Pages 10 and 23 of PDB-1 and PDB-2, respectively, should be removed and the enclosed pages inserted in their respective places. |
| 4.          | Vol. IV<br>PDB-1,<br>PDB-2          | PDB-1, and E-1, PDB-2 to return lamps and ballasts that are removed and are in good working order to PBA.   |

PROJECT: EEAP, LIGHTING STUDY, PINE BLUFF ARSENAL, DACA01-94-D-0038, DELIVERY ORDER NO. 0001

REVIEWER: EMMERLING

DATE: 10 JULY 95

FINAL SUBMITTAL COMMENTS

| <u>CMT #</u> | <u>REF</u> | <u>COMMENT</u>  |
|--------------|------------|---|
| 1            | VOL I      | IF AT ALL POSSIBLE PROVIDE COEFFICIENT OF UTILIZATION (CU) FOR PRESENT AND PROPOSED EACH ROOM, EACH BLDG. THIS CAN BE ADDED TO THE "PINE BLUFF ARSENAL CALCULATIONS SUMMARY". IN THE INTERIM SUBMITTAL COMMENT MEETING IT WAS DECIDED THAT YOU WOULD PROVIDE MFG'S CU SHEETS (YOU CALL THIS FIXTURE DATA IN YOUR RESPONSES TO THE INTERIM SUBMITTAL) TO SATISFY THIS COMMENT WHICH WAS DONE BUT I WAS NOT ABLE TO CROSS REFERENCE THE POINT BY POINT CALCULATION SHEET FIXTURE MODEL NOS. TO THE MFG'S CU SHEETS TO CHECK YOUR FT-C CALCULATIONS USING THE ZONAL CAVITY METHOD. |
| 2            | VOL I      | PAGE 6-2, <u>PROPOSED LLF</u> , "DIRT DEPRECIATION AS 0.87 (ASSUMING FIXTURES ARE CLEANED). FIXTURES RETROFIT WITH REFLECTORS WOULD BE CONSIDERED AS NEW (DIRT DEPRECIATION = 1.0)". PROVIDE ASSUMED FIXTURE CLEANING INTERVALS TO MAINTAIN THESE ASSUMPTIONS.  |
| 3            | VOL IV     | I DID NOT SEE ANY COMMENTS ON DISPOSAL OF FLOURESCENT LAMPS WHICH MAY CONTAIN MERCURY. COORDINATE WITH THE PINE BLUFF ARSENAL DPW ON THIS.  |
| 4            | VOL IV     | THE PBA DPW HAS INDICATED THAT EXISTING LAMPS AND BALLASTS TO BE REMOVED SHOULD BE TURNED OVER TO THE GOVT. FOR REUSE IF NOT PCB CONTAMINATED AND IN GOOD SHAPE. PROVIDE NOTES ON THIS IN THE PDB.  |

Present CU - The coefficient of utilization (CU) of the present fixtures.

Present LLF - The light-loss-factor (LLF) used for each of the present fixtures. The LLF is the product of the ballast factor, the lamp depreciation factor and the dirt depreciation factor. For electromagnetic ballasts, the factor is usually set at ~0.95. The lamp depreciation and the dirt depreciation are somewhat subjective. For new or fairly-new lamps, the depreciation factor is usually set at 0.9 to take into account at 10 percent light loss over the average lifetime of the lamp. Dirt depreciation is a function of fixture and room conditions. Office environments are usually taken as clean; production area environments as medium. The depreciation for yellowed lenses or generally dirty fixtures was also factored in. The following dirt depreciation factors were used: very clean, 0.87; clean, 0.81; medium, 0.75; dirty, 0.68; very dirty, 0.61.

As stated in Section 4, the present-fixture calculation factors were adjusted to try to approximate the observed conditions. The reader must be cautioned, however, that the fixture selections, coefficients of utilization and depreciation factors are only approximations, and are meant to present a situation showing where changes in fixture components can be made to increase efficiencies and improve lighting quality.

Proposed Avg. Calc. FC - The average foot-candles calculated for the changed fixtures, either retrofits or new. Illuminance contours are presented for each room in Volumes IIA - IIE and should be consulted for a more accurate analysis of the lighting calculations. Reflectances were assumed to remain the same as the present case.

Proposed CU - The coefficient of utilization of the proposed fixtures.

Proposed LLF - The light loss factor used for the new or retrofit fixtures. Electronic Ballast factor was taken as 0.88 - 0.90, lamp depreciation as 0.9, dirt depreciation as 0.87 (assuming fixtures are cleaned). Fixtures retrofit with reflectors would be considered as new (dirt depreciation = 1.0). Lamps above a porous ceiling grid had a miscellaneous depreciation factor added to account for light loss. Fixtures should be cleaned at least once per year to maintain the LLF.

\* Multiple Fixtures Used

# Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room     | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |         |              | Proposed    |         |          |
|--------|----------|--------------------|------------------|------------------|-------------|---------|--------------|-------------|---------|----------|
|        |          |                    |                  |                  | Avg Calc FC | CU      | LLF          | Avg Calc FC | CU      | LLF      |
| 10-020 | Break    | Lounge             | 15               | 42               | 27          | 0.672   | .36/.72*     | 21          | 0.672   | 0.59     |
|        | Vending  | Lounge             | 15               | 23               | 19          | 0.464   | 0.47         | 24          | 0.488   | 0.58     |
|        | 100      | Office             | 50               | 58               | 48          | 0.584   | 0.51         | 50          | 0.604   | 0.79     |
|        | 101      | Office             | 50               | 60               | 53          | 0.559   | 0.51         | 46          | 0.499   | 0.79     |
|        | 103      | Office             | 50               | 58               | 59          | 0.549   | 0.51         | 50          | 0.491   | 0.79     |
|        | 106      | Office             | 50               | 70               | 62          | 0.423   | 0.68         | 44          | 0.556   | 0.79     |
|        | 107      | Office             | 50               | 56               | 78          | 0.481   | 0.68         | 40          | 0.542   | 0.79     |
|        | 112      | Office             | 50               | 66               | 53          | 0.556   | 0.51         | 40          | 0.579   | 0.79     |
|        | Hall     | Corridor           | 10               | 44               | 37          | 0.427   | 0.51         | 10          | 0.256   | 0.47     |
|        | 115      | Office             | 50               | 86               | 76          | 0.603   | 0.51         | 42          | 0.62    | 0.79     |
|        | 117      | Office             | 50               | 83               | 57          | 0.544   | .68/.51*     | 43          | 0.568   | 0.79     |
|        | 201/203  | Office             | 50               | 73               | 39          | 0.658   | 0.48         | 39          | 0.667   | 0.79     |
|        | 202      | Office             | 50               | 88               | 60          | 0.457   | 0.73         | 47          | 0.702   | 0.79     |
|        | 205      | Office             | 50               | 67               | 67          | 0.574   | 0.51         | 56          | 0.512   | 0.79     |
|        | 206      | Office             | 50               | 60               | 58          | 0.505   | 0.68         | 43          | 0.658   | 0.79     |
|        | 207      | Office             | 50               | 72               | 66          | 0.524   | 0.84         | 37          | 0.59    | 0.79     |
|        | 209      | Office             | 50               | 78               | 66          | 0.529   | 0.84         | 37          | 0.595   | 0.79     |
|        | 221      | Office             | 50               | 58               | 40          | 0.568   | 0.51         | 40          | 0.59    | 0.79     |
|        | 223/229  | Office             | 50               | 61               | 70          | 0.514   | 0.68         | 42          | 0.582   | 0.79     |
|        | 228      | Office             | 50               | 35               | 47          | 0.458   | 0.51         | 36          | 0.492   | 0.79     |
|        | 231      | Office             | 50               | 79               | 31          | 0.542   | 0.51         | 36          | 0.567   | 0.79     |
|        | 232      | Office             | 50               | 50               | 46          | 0.719   | 0.51         | 35          | 0.718   | 0.79     |
|        | 263      | Office             | 50               | 69               | 50          | 0.572   | 0.51         | 43          | .5/.59* | .69/.79* |
|        | 265      | Office             | 50               | 41               | 42          | 0.55    | 0.51         | 36          | 0.492   | 0.79     |
|        | 266      | Office             | 50               | 79               | 45          | 0.626   | 0.51         | 46          | 0.64    | 0.79     |
|        | 267      | Office             | 50               | 73               | 45          | 0.527   | 0.51         | 47          | 0.554   | 0.79     |
|        | 269      | Office             | 50               | 56               | 43          | 0.598   | 0.51         | 44          | 0.616   | 0.79     |
|        | 270      | Office             | 50               | 89               | 48          | 0.588   | 0.51         | 45          | .52/.61 | 0.79     |
|        | 282      | Office             | 50               | 95               | 63          | 0.519   | 0.73         | 39          | 0.585   | 0.79     |
|        | 284      | Office             | 50               | 57               | 43          | 0.542   | 0.51         | 34          | 0.567   | 0.79     |
|        | 286B     | Office             | 50               | 66               | 58          | 0.48    | .58/.73*     | 40          | 0.548   | 0.79     |
|        | 288      | Office             | 50               | 82               | 59          | 0.476   | 0.68         | 45          | 0.621   | 0.79     |
|        | 289      | Storage            | 5                | 39               | 27          | 0.456   | 0.68         | 6           | 0.444   | 0.83     |
|        | 292A     | Office             | 50               | 50               | 40          | 0.551   | 0.51         | 47          | 0.575   | 0.88     |
|        | 292      | Office             | 50               | 37               | 28          | 0.465   | .51/.68*     | 33          | 0.5     | 0.79     |
|        | 290      | Lounges            | 15               | 79               | 61          | 0.715   | 0.51         | 23          | 0.604   | 0.69     |
|        | 215      | Office             | 50               | 50               | 77          | 0.563   | 0.51         | 40          | 0.49    | 0.69     |
|        | 213/216  | Office             | 50               | 67               | 23          | .55/.71 | .48/.68*     | 24          | 0.711   | 0.79     |
|        | 217      | Office             | 50               | 46               | 56          | 0.536   | 0.51         | 45          | 0.48    | 0.79     |
|        | Cashier  | Office             | 50               | 50               | 62          | .38/.47 | .68/.73*     | 44          | .41/.5  | .69/.79* |
|        | Restroom | Toilet             | 20               | 51               | 65          |         | .68/.73/.77* |             |         |          |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room             | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |          |
|--------|------------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|----------|
|        |                  |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF      |
| 10-030 | Conference       | Conference         | 30               | 65               | 43          | 0.55  | 0.68 | 30          | 0.588 | 0.79     |
|        | Ent Hall         | Corridor           | 10               | 38               | 22          | 0.617 | 0.63 | 14          | 0.688 | 0.64     |
|        | File Rm 1        | Office             | 50               | 49               | 43          | 0.54  | 0.63 | 35          | 0.644 | 0.79     |
|        | Storage          | Storage            | 5                | 78               | 32          | 0.531 | 0.63 | 26          | 0.592 | 0.64     |
|        | Office 1         | Office             | 50               | 71               | 42          | 0.494 | 0.63 | 35          | 0.588 | 0.79     |
|        | Open Office 1    | Office             | 50               | 52               | 41          | 0.644 | 0.63 | 43          | 0.644 | 0.64     |
|        | Office 2         | Office             | 50               | 58               | 43          |       | 0.63 | 42          |       | 0.69     |
|        | Office 2,3,4,5,6 | Office             | 50               | 91               | 43          | 0.468 | 0.63 | 42          | 0.499 | 0.69     |
|        | Breakroom        | Lounge             | 15               |                  | 18          | 0.629 | 0.63 | 20          | 0.629 | 0.64     |
|        | Restroom         | Toilet             | 20               | 56               | 40          | 0.535 | 0.73 | 17          | 0.525 | 0.73     |
|        | Janitor Rm       | Janitorial Clst.   | 5                | 63               | 56          | 0.095 | 0.68 | 15          | 0.11  | 0.68     |
|        | Office 7         | Office             | 50               | 43               | 27          | 0.526 | 0.68 | 35          | 0.613 | 0.79     |
|        | Office 8         | Office             | 50               | 53               | 52          | 0.425 | 0.63 | 50          | 0.453 | 0.69     |
|        | E Entrance 1     | Corridor           | 10               | 65               | 22          | 0.307 | 0.68 | 22          | 0.307 | 0.64     |
|        | Hallway          | Corridor           | 10               | 64               | 18          | 0.648 | 0.63 | 17          | 0.648 | 0.64     |
|        | Restroom         | Toilet             | 20               | 21               | 12          | 0.338 | 0.63 | 14          | 0.436 | 0.69     |
|        | Office 9         | Office             | 50               | 52               | 18          | 0.581 | 0.63 | 17          | 0.696 | 0.64/79* |
|        | Open Office 2    | Office             | 50               | 81               | 60          | 0.622 | 0.68 | 43          | 0.794 | 0.79     |
|        | Computer Rm      | Computer Rm        | 50               | 71               | 50          | 0.423 | 0.68 | 41          | 0.479 | 0.69     |
|        | S Entrance       |                    |                  | 101              | 57          | 0.39  | 0.68 | 14          | 0.412 | 0.68     |

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 10-050 | Foyer         | Corridor           | 10               | 76               | 47          | 0.572 | 0.68     | 17          | 0.741 | 0.84     |
|        | Office 1      | Office             | 50               | 73               | 47          | 0.572 | 0.68     | 35          | 0.741 | 0.84     |
|        | Bay 1         | Garage             | 5                | 27               |             | 0.465 | 0.67     |             |       |          |
|        | Bay 2         | Garage             | 5                | 19               |             | 0.54  | 0.68     |             |       |          |
|        | Office 2      | Office             | 50               | 66               | 47          | 0.572 | 0.68     | 35          | 0.741 | 0.84     |
|        | Hallway       | Corridor           | 10               | 39               | 34          | 0.555 | 0.73     | 31          | 0.564 | 0.66     |
|        | Dining        | Cafeteria          | 25               | 24               |             | 0.795 | 0.72/78* |             |       |          |
|        | Kitchen       | Kitchen            | 70               | 40               | 46          | 0.546 | 0.68     | 68          | 0.637 | 0.84     |
|        | Lounge        | Lounge             | 15               |                  | 23          | 0.652 | 0.73     | 21          | 0.666 | 0.66     |
|        | Exercise      |                    |                  | 44               | 29          | 0.652 | 0.73     | 26          | 0.666 | 0.66     |
|        | Laundry       |                    |                  | 45               | 27          | 0.538 | 0.73     | 25          | 0.547 | 0.66     |
|        | Sleeping Area |                    |                  | 27               | 10          | 0.359 | 0.73/76* | 9           | 0.359 | 0.66/76* |
|        | TV Room       | Lounge             | 15               |                  | 54          | 0.53  | 0.68     | 27          | 0.606 | 0.66     |
|        | Office 3      | Office             | 50               | 59               | 50          | 0.48  | 0.68     | 36          | 0.617 | 0.84     |
|        | Ladies Rm     | Toilet             | 20               | 54               | 49          | 0.381 | 0.68     | 24          | 0.431 | 0.66     |
|        | Bay 3         | Garage             | 5                | 20               |             | 0.412 | 0.67     |             |       |          |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room          | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |          | Proposed       |       |      |
|--------|---------------|-----------------------|------------------------|------------------------|----------------|-------|----------|----------------|-------|------|
|        |               |                       |                        |                        | Avg Calc<br>FC | CU    | LLF      | Avg Calc<br>FC | CU    | LLF  |
| 13-010 | Offices       | Office                | 50                     | 55                     | 62             | 0.379 | 0.68     | 43             | 0.484 | 0.81 |
|        | Restroom      | Toilet                | 20                     | 20                     |                | 0.375 | .60/.75* |                |       |      |
|        | Training Room | Office                | 50                     | 53                     | 76             | 0.48  | 0.68     | 41             | 0.538 | 0.7  |
|        | Hallway       | Corridor              | 10                     |                        | 19             | 0.315 | 0.68     | 21             | 0.327 | 0.7  |

| Bldg.  | Room           | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |              | Proposed       |       |          |
|--------|----------------|-----------------------|------------------------|------------------------|----------------|-------|--------------|----------------|-------|----------|
|        |                |                       |                        |                        | Avg Calc<br>FC | CU    | LLF          | Avg Calc<br>FC | CU    | LLF      |
| 13-020 | Waiting Room   | Lobby                 | 15                     | 56                     | 27             | 0.589 | 0.68         | 24             | 0.589 | 0.66     |
|        | Entrance Foyer | Corridor              | 10                     | 34                     |                | 0.435 | 0.73         |                | 0.435 | 0.7      |
|        | Recep Office   | Office                | 50                     | 48                     |                | 0.389 | 0.73         |                | 0.389 | 0.7      |
|        | Records Office | Office                | 50                     | 38                     |                | 0.484 | 0.73         |                | 0.484 | 0.7      |
|        | Office 1       | Office                | 50                     |                        |                | 0.518 | 0.73         |                | 0.655 | 0.81     |
|        | Womens Rm      | Toilet                | 20                     | 5                      |                | 0.308 | 0.77         |                |       |          |
|        | Mens Rm        | Toilet                | 20                     |                        |                | 0.308 | 0.77         |                |       |          |
|        | Doctors Office | Office                | 50                     | 58                     |                | 0.484 | .68/.73*     |                | 0.55  | 0.81     |
|        | Exam Room      | Office                | 50                     | 50                     |                | 0.461 | 0.73         |                | 0.587 | 0.81     |
|        | Patient Lobby  | Lobby                 | 15                     | 22                     |                | 0.362 | 0.68         |                | 0.362 | 0.66     |
|        | Hallway        | Corridor              | 10                     | 53                     |                | 0.335 | .68/.73/.77* |                | 0.335 | .66/.77* |
|        | X-Ray Develop  |                       |                        | 13                     |                |       |              |                |       |          |
|        | X-Ray Reading  |                       |                        | 14                     |                |       |              |                |       |          |
|        | X-Ray          | Office                | 50                     | 66                     | 49             | 0.437 | 0.68         | 38             | 0.564 | 0.9      |
|        | X-Ray Tech     |                       |                        | 20                     | 29             | 0.348 | 0.58         | 30             | 0.388 | 0.81     |
|        | Waiting Room   | Lobby                 | 15                     | 29                     | 29             | 0.348 | 0.58         | 30             | 0.388 | 0.81     |
|        | Restroom       | Toilet                | 20                     | 6                      |                | 0.064 | 0.77         |                |       |          |
|        | Records Stg    | Storage               | 5                      | 25                     | 23             | 0.42  | 0.73         | 21             | 0.42  | 0.7      |
|        | Hallway 2      | Corridor              | 10                     | 35                     | 32             | 0.388 | 0.58         | 20             | 0.391 | 0.66     |
|        | Scrub Room     | Office                | 50                     | 51                     | 68             | 0.353 | 0.68         | 53             | 0.454 | 0.9      |
|        | Operating Rm   |                       |                        | 62                     | 67             | 0.49  | 0.68         | 63             | 0.49  | 0.69     |
|        | Medicine Stg   |                       | 50                     | 98                     | 87             | 0.367 | 0.68         | 69             | 0.473 | 0.9      |
|        | Ambulance Ent  | Corridor              | 10                     |                        | 14             | 0.276 | 0.68         | 13             | 0.276 | 0.66     |



\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|----------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |                |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 13-030 | Operations     | Office             | 50               | 89               | 61          | 0.454 | 0.68 | 44          | 0.586 | 0.81 |
|        | Clerks Room    | Office             | 50               | 14               | 33          | 0.402 | 0.68 | 29          | 0.402 | 0.66 |
|        | Commander Off  | Office             | 50               | 49               | 34          | 0.39  | 0.68 | 30          | 0.39  | 0.66 |
|        | Security Room  | Office             | 50               | 20               | 17          | 0.36  | 0.68 | 15          | 0.36  | 0.66 |
|        | SR Supervisor  | Office             | 50               | 39               | 37          | 0.376 | 0.68 | 33          | 0.376 | 0.66 |
|        | Pubs. Room     | Office             | 50               | 35               | 37          | 0.376 | 0.68 | 33          | 0.376 | 0.66 |
|        | Latrine        | Toilet             | 20               | 44               | 17          | 0.36  | 0.68 | 15          | 0.36  | 0.66 |
|        | Equip. Room    | Storage            | 5                | 18               | 19          | 0.325 | 0.68 | 17          | 0.325 | 0.66 |
|        | Laundry        |                    |                  |                  | 19          | 0.325 | 0.68 | 17          | 0.325 | 0.66 |
|        | Maint Office   | Office             | 50               | 59               | 37          | 0.376 | 0.68 | 33          | 0.376 | 0.66 |
|        | Supply Storage | Storage            | 5                | 11               | 17          | 0.36  | 0.68 | 15          | 0.36  | 0.66 |
|        | Supply Office  | Office             | 50               | 25               | 37          | 0.376 | 0.68 | 33          | 0.376 | 0.66 |
|        | Dressing Room  | Lounge             | 15               |                  | 17          | 0.36  | 0.68 | 26          | 0.484 | 0.81 |
|        | Classroom      | Conference         | 30               | 47               | 52          | 0.487 | 0.68 | 47          | 0.487 | 0.66 |
|        | Classroom Off  | Office             | 50               | 54               | 32          | 0.397 | 0.68 | 29          | 0.397 | 0.66 |
|        | Kitchen        | Kitchen            | 70               | 43               | 33          | 0.489 | 0.68 | 30          | 0.489 | 0.66 |
|        | Work Room      | Office             | 50               | 18               | 20          | 0.327 | 0.68 | 30          | 0.439 | 0.81 |
|        | Tool Room      | Storage            | 5                | 18               | 25          | 0.124 | 0.68 | 22          | 0.124 | 0.66 |
|        | Latrine        | Toilet             | 20               |                  | 7           | 0.057 | 0.77 |             |       |      |
|        | Hallway        | Corridor           | 10               | 48               | 20          | 0.352 | 0.68 | 14          | 0.452 | 0.81 |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |           |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 13-040 | 1         | Office             | 50               | 44               | 38          | 0.431 | 0.68     | 34          | 0.431 | 0.66     |
|        | 2         | Lounge             | 15               | 44               | 30          | 0.47  | 0.68     | 27          | 0.47  | 0.66     |
|        | 3         | Office             | 50               | 53               | 38          | 0.631 | 0.71     | 35          | 0.631 | 0.69     |
|        | 4         | Office             | 50               | 52               | 47          | 0.465 | 0.71     | 43          | 0.465 | 0.69     |
|        | 5         | Office             | 50               | 64               | 47          | 0.465 | 0.71     | 43          | 0.465 | 0.69     |
|        | 6         | Storage            | 5                |                  | 47          | 0.527 | 0.71     | 43          | 0.527 | 0.69     |
|        | 7         | Office             | 50               | 53               | 32          | 0.514 | .71/.82* | 29          | 0.514 | .50/.69* |
|        | 8         | Office             | 50               | 66               | 49          | 0.527 | 0.71     | 45          | 0.527 | 0.69     |
|        | 9         | Lounge             | 15               | 89               | 52          | 0.527 | 0.71     | 31          | 0.527 | 0.69     |
|        | Mens Rm   | Toilet             | 20               | 63               | 19          | 0.433 | 0.71     |             | 0.433 | 0.69     |
|        | Womens Rm | Toilet             | 20               |                  | 32          | 0.145 | 0.71     | 29          | 0.145 | 0.69     |
|        | Hallway   | Corridor           | 10               | 43               | 45          | 0.375 | 0.71     | 19          | 0.375 | 0.69     |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|----------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |                |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 13-060 | TV Room        | Lounge             | 15               | 28               | 16          | 0.308 | 0.68 |             |       |      |
|        | Supervisor Off | Office             | 50               | 60               | 54          | 0.388 | 0.68 | 47          | 0.592 | 0.81 |
|        | Eye Exam       | Office             | 50               | 60               | 60          | 0.407 | 0.68 | 52          | 0.622 | 0.81 |
|        | Restroom 1     | Toilet             | 20               | 39               | 47          | 0.328 | 0.68 | 28          | 0.436 | 0.66 |
|        | Stg Room 1     | Storage            | 5                |                  | 46          | 0.328 | 0.68 | 28          | 0.436 | 0.66 |
|        | Office 1       | Office             | 50               | 86               | 84          | 0.378 | 0.68 | 51          | 0.503 | 0.66 |
|        | Office 2       | Office             | 50               | 85               | 71          | 0.359 | 0.68 | 43          | 0.477 | 0.66 |
|        | Recept Room    | Office             | 50               | 74               | 84          | 0.378 | 0.68 | 51          | 0.503 | 0.66 |
|        | Hallway        | Corridor           | 10               | 56               | 61          | 0.371 | 0.68 | 16          | 0.493 | 0.66 |

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |      |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF  |
| 13-080 | Lab Area 1    |                    |                  | 62               | 47          | 0.595 | .58/.81* | 42          | 0.578 | 0.66 |
|        | Lab Area 2    |                    |                  | 56               | 45          | 0.502 | 0.58     | 33          | 0.498 | 0.66 |
|        | Storage       | Storage            | 5                |                  | 10          | 0.275 | 0.81     |             |       |      |
|        | Urinalysis    |                    |                  | 54               | 49          | 0.368 | 0.58     | 42          | 0.407 | 0.66 |
|        | Vini-Puncture |                    |                  | 88               | 71          | 0.367 | 0.68     | 64          | 0.367 | 0.66 |
|        | Office        | Office             | 50               | 38               | 41          | 0.428 | 0.58     | 34          | 0.463 | 0.66 |
|        | Womens Rm     | Toilet             | 20               | 22               | 18          | 0.073 | 0.82     | 19          | 0.076 | 0.5  |
|        | Mens Rm       | Toilet             | 20               | 10               | 18          | 0.073 | 0.82     | 19          | 0.076 | 0.5  |

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |              |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 13-100 | Waiting Rm   | Lobby              | 15               | 22               | 28          | 0.602 | 0.68 | 30          | 0.602 | 0.66 |
|        | Pharmacy     |                    |                  | 50               | 41          | 0.446 | 0.68 | 44          | 0.446 | 0.66 |
|        | Pharm Office | Office             | 50               | 52               | 41          | 0.355 | 0.68 | 43          | 0.355 | 0.66 |
|        | Storage 1    | Storage            | 5                | 40               | 35          | 0.392 | 0.68 | 18          | 0.421 | 0.66 |
|        | Hallway      | Corridor           | 10               |                  | 15          | 0.325 | 0.68 | 16          | 0.325 | 0.66 |
|        | Pharmacy Stg | Storage            | 5                | 10               | 7           | 0.282 | 0.76 |             |       |      |
|        | Storage 2    | Storage            | 5                | 57               | 43          | 0.459 | 0.68 | 27          | 0.496 | 0.66 |
|        | Restroom     | Toilet             | 20               | 16               | 7           | 0.289 | 0.76 |             |       |      |
|        | Mech Room    | Mechanical         | 15               | 27               | 22          | 0.337 | 0.68 | 24          | 0.337 | 0.66 |
|        | Dental Rm 2  |                    |                  | 24               | 16          | 0.431 | 0.68 |             |       |      |
|        | Dental Rm 1  |                    |                  | 20               | 29          | 0.431 | 0.68 |             |       |      |
|        | Dental Stg   | Storage            | 5                | 22               | 20          | 0.379 | 0.68 |             |       |      |
|        | X-Ray        |                    |                  | 34               | 20          | 0.379 | 0.68 |             |       |      |

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |           | Proposed    |           |
|--------|-------------|--------------------|------------------|------------------|-------------|-----------|-------------|-----------|
|        |             |                    |                  |                  | Avg Calc FC | LLF       | Avg Calc FC | LLF       |
| 13-110 | Restroom    | Toilet             | 20               | 12               |             |           |             |           |
|        | Open Area 1 | Office             | 50               | 120              | 75          | .739/.657 | 45          | .739/.657 |
|        |             |                    |                  |                  |             |           |             | .50/.66*  |

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |          | Proposed    |          |
|--------|----------------|--------------------|------------------|------------------|-------------|----------|-------------|----------|
|        |                |                    |                  |                  | Avg Calc FC | LLF      | Avg Calc FC | LLF      |
| 16-210 | Hallway        | Corridor           | 10               | 43               | 24          | 0.448    | 15          | 0.457    |
|        | Kitchen        | Kitchen            | 70               | 43               | 25          | 0.506    | 22          | 0.506    |
|        | Latrine&Laun   | Toilet             | 20               | 35               | 18          |          | 16          |          |
|        | 2nd Floor Hall | Corridor           | 10               | 45               | 28          | 0.446    | 13          | 0.41     |
|        | Latrine 2      | Toilet             | 20               |                  | 18          | 0.48     | 16          | 0.376    |
|        |                |                    |                  |                  |             | .60/.68* |             | .58/.66* |

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|----------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |                |                    |                  |                  | Avg Calc FC | LLF   | Avg Calc FC | LLF   |
| 31-010 | Calibration Lb |                    |                  | 99               | 78          | 0.497 | 71          | 0.497 |
|        |                |                    |                  |                  |             |       |             | 0.66  |

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |              |                    |                  |                  | Avg Calc FC | LLF   | Avg Calc FC | LLF   |
| 31-080 | Foyer        | Corridor           | 10               | 52               | 22          | 0.51  | 16          | 0.568 |
|        | Restroom     | Toilet             | 20               | 32               | 13          | 0.485 | 14          | 0.485 |
|        | Breakroom    | Lounge             | 15               | 78               | 60          | 0.466 | 36          | 0.494 |
|        | TMDE Storage | Storage            | 5                | 58               | 47          | 0.505 | 53          | 0.505 |
|        | Lab          |                    | 60               | 66               | 66          | 0.632 | 68          | 0.632 |
|        | Office       | Office             | 50               | 86               | 56          | 0.478 | 34          | 0.506 |
|        | Computer     | Computer           | 50               | 46               | 42          | 0.436 | 68          | 0.462 |
|        |              |                    |                  |                  |             | 0.63  |             | 0.66  |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |           |                    |                  |                  | Avg Calc FC | LLF   | Avg Calc FC | LLF   |
| 32-030 | Tire Shop |                    |                  | 65               | 21          | 0.704 | 29          | 0.642 |
|        |           |                    |                  |                  |             |       |             | 0.66  |

| Bldg.  | Room       | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |            |                    |                  |                  | Avg Calc FC | LLF   | Avg Calc FC | LLF   |
| 32-035 | Motor Pool |                    |                  | 30               | 50          | 0.714 | 45          | 0.714 |
|        |            |                    |                  |                  |             | 0.68  |             | 0.66  |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |           | Proposed    |           |
|--------|-------------|--------------------|------------------|------------------|-------------|-----------|-------------|-----------|
|        |             |                    |                  |                  | Avg Calc FC | CU        | Avg Calc FC | CU        |
| 13-110 | Restroom    | Toilet             | 20               | 12               |             |           |             |           |
|        | Open Area 1 | Office             | 50               | 120              | 75          | .739/.657 | 45          | .739/.657 |
|        |             |                    |                  |                  |             |           |             | .50/.66*  |

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |          | Proposed    |          |
|--------|----------------|--------------------|------------------|------------------|-------------|----------|-------------|----------|
|        |                |                    |                  |                  | Avg Calc FC | CU       | Avg Calc FC | CU       |
| 16-210 | Hallway        | Corridor           | 10               | 43               | 24          | 0.448    | 15          | 0.457    |
|        | Kitchen        | Kitchen            | 70               | 43               | 25          | 0.506    | 22          | 0.506    |
|        | Latrine&Laun   | Toilet             | 20               | 35               | 18          |          | 16          |          |
|        | 2nd Floor Hall | Corridor           | 10               | 45               | 28          | 0.446    | 13          | 0.41     |
|        | Latrine 2      | Toilet             | 20               |                  | 18          | 0.48     | 16          | 0.376    |
|        |                |                    |                  |                  |             | .60/.68* |             | .58/.66* |

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|----------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |                |                    |                  |                  | Avg Calc FC | CU    | Avg Calc FC | CU    |
| 31-010 | Calibration Lb |                    |                  | 99               | 78          | 0.497 | 71          | 0.497 |
|        |                |                    |                  |                  |             |       |             | 0.66  |

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |              |                    |                  |                  | Avg Calc FC | CU    | Avg Calc FC | CU    |
| 31-080 | Foyer        | Corridor           | 10               | 52               | 22          | 0.51  | 16          | 0.568 |
|        | Restroom     | Toilet             | 20               | 32               | 13          | 0.485 | 14          | 0.485 |
|        | Breakroom    | Lounge             | 15               | 78               | 60          | 0.466 | 36          | 0.494 |
|        | TMDE Storage | Storage            | 5                | 58               | 47          | 0.505 | 53          | 0.505 |
|        | Lab          |                    | 60               | 66               | 66          | 0.632 | 68          | 0.632 |
|        | Office       | Office             | 50               | 86               | 56          | 0.478 | 34          | 0.506 |
|        | Computer     | Computer           | 50               | 46               | 42          | 0.436 | 68          | 0.462 |
|        |              |                    |                  |                  |             |       |             | 0.66  |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |           |                    |                  |                  | Avg Calc FC | CU    | Avg Calc FC | CU    |
| 32-030 | Tire Shop |                    |                  | 65               | 21          | 0.704 | 29          | 0.642 |
|        |           |                    |                  |                  |             |       |             | 0.66  |

| Bldg.  | Room       | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       | Proposed    |       |
|--------|------------|--------------------|------------------|------------------|-------------|-------|-------------|-------|
|        |            |                    |                  |                  | Avg Calc FC | CU    | Avg Calc FC | CU    |
| 32-035 | Motor Pool |                    |                  | 30               | 50          | 0.714 | 45          | 0.714 |
|        |            |                    |                  |                  |             |       |             | 0.66  |

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|-------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |             |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 32-060 | Compress Rm | Mechanical         | 15               | 54               | 19          | 0.348 | 0.72     | 17          | 0.348 | 0.7      |
|        | Boiler Room | Mechanical         | 15               |                  | 3           | 0.488 | .68/.76* | 3           | 0.488 | .66/.76* |

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |              |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 32-070 | Laundry      |                    |                  | 55               | 57          | 0.657 | 0.69 | 56          | 0.657 | 0.66 |
|        | Incpreg Area |                    |                  |                  | 47          | 0.658 | 0.69 | 46          | 0.658 | 0.66 |
|        | Breakroom    | Lounge             | 15               | 36               | 63          | 0.541 | 0.69 | 40          | 0.541 | 0.66 |
|        | Mens Rm      | Toilet             | 20               | 6                | 20          | 0.541 | 0.69 | 19          | 0.541 | 0.66 |
|        | Ladies Rm    | Toilet             | 20               | 6                | 20          | 0.541 | 0.69 | 19          | 0.541 | 0.66 |
|        | Office       | Office             | 50               | 44               | 25          | 0.473 | 0.68 | 23          | 0.473 | 0.66 |

| Bldg.  | Room | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |      |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 32-090 | 1    | Office             | 50               | 28               | 73          | 0.506 | 0.68 | 42          | 0.653 | 0.66 |
|        | 2    | Corridor           | 10               |                  | 30          | 0.366 | 0.68 | 18          | 0.504 | 0.66 |
|        | 3    |                    |                  |                  |             |       | 0.68 |             |       |      |
|        | 4    | Toilet             | 20               | 86               | 58          | 0.096 | 0.68 | 35          | 0.129 | 0.66 |
|        | 5    | Toilet             | 20               | 86               | 58          | 0.096 | 0.68 | 35          | 0.129 | 0.66 |
|        | 6    | Office             | 50               | 106              | 83          | 0.524 | 0.68 | 50          | 0.715 | 0.66 |
|        | 7    | Office             | 50               | 43               | 19          | 0.435 | 0.68 | 22          | 0.58  | 0.67 |
|        | 8    | Storage            | 5                | 60               | 40          | 0.414 | 0.68 | 33          | 0.631 | 0.81 |
|        | 9    | Office             | 50               | 104              | 33          | 0.512 | 0.68 | 42          | 0.783 | 0.81 |
|        | 10   | Lounge             | 15               | 89               | 39          | 0.557 | 0.68 | 23          | 0.756 | 0.66 |
|        | 11   | Office             | 50               | 53               | 48          | 0.461 | 0.68 | 42          | 0.704 | 0.81 |
|        | 12   | Office             | 50               | 35               | 40          | 0.535 | 0.68 | 35          | 0.82  | 0.81 |
|        | 13   | Conf Room          | 30               | 91               | 86          | 0.556 | 0.68 | 39          | 0.608 | 0.66 |
|        | 14   | Storage            | 5                |                  | 25          | 0.532 | 0.78 |             |       |      |
|        | 15   | Storage            | 5                |                  | 25          |       | 0.78 |             |       |      |
|        | 16   | Toilet             | 20               | 83               | 30          | 0.435 | 0.68 | 19          | 0.597 | 0.66 |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room            | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |      |
|--------|-----------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|------|
|        |                 |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF  |
| 32-100 | Office 1        | Office             | 50               | 76               | 59          | 0.543 | 0.68     | 44          | 0.612 | 0.66 |
|        | Office 2        | Office             | 50               | 87               | 59          | 0.462 | 0.68     | 34          | 0.592 | 0.66 |
|        | Break Room      | Lounge             | 15               | 32               | 41          | 0.526 | 0.68     | 21          | 0.607 | 0.66 |
|        | Restroom        | Toilet             | 20               | 26               | 32          | 0.482 | 0.73     | 29          | 0.482 | 0.7  |
|        | Ent/Hall        | Corridor           | 10               | 19               | 34          | 0.402 | 0.68     | 30          | 0.402 | 0.66 |
|        | Storage 1       | Storage            | 5                | 39               | 25          | 0.475 | 0.68     | 23          | 0.475 | 0.66 |
|        | Lab             |                    |                  | 100              | 106         | 0.671 | 0.68     | 54          | 0.744 | 0.66 |
|        | Hallway         | Corridor           | 10               | 73               | 52          | 0.493 | 0.68     | 10          | 0.547 | 0.66 |
|        | Electr. Testing |                    |                  | 67               | 53          | 0.481 | 0.68     | 50          | 0.505 | 0.66 |
|        | Storage 2       | Storage            | 5                | 33               | 26          | 0.453 | 0.68     | 23          | 0.453 | 0.66 |
|        | Training Area   |                    |                  | 58               | 65          | 0.539 | 0.68     | 33          | 0.622 | 0.66 |
|        | Rebuild Shop    |                    |                  | 120              | 74          | 0.636 | .67/.68* | 46          | 0.636 | 0.66 |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |           |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 32-130 | Lab       |                    |                  | 87               | 95          | 0.75  | 0.68 | 52          | 0.801 | 0.66 |
|        | Sub Lab   |                    |                  | 124              | 67          | 0.729 | 0.68 | 37          | 0.779 | 0.66 |
|        | Restrooms | Toilet             | 20               | 22               | 24          | 0.491 | 0.6  | 15          | 0.281 | 0.5  |
|        | Storage   | Storage            | 5                | 10               | 37          | 0.415 | 0.68 | 18          | 0.415 | 0.66 |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |           |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 32-150 | Offices   | Office             | 50               | 39               |             | 0.537 | 0.68 |             | 0.537 | 0.66 |
|        | Restrooms | Toilet             | 20               | 42               |             | 0.322 | 0.68 |             | 0.322 | 0.66 |

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|-------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |             |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 33-060 | Compress Rm | Mechanical         | 15               | 54               | 19          | 0.348 | 0.72     | 17          | 0.348 | 0.72     |
|        | Boiler Room | Mechanical         | 15               |                  | 3           | 0.488 | .68/.76* | 3           | 0.488 | .68/.76* |

| Bldg.  | Room      | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |      |
|--------|-----------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|------|
|        |           |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF  |
| 33-530 | North End |                    |                  | 38               | 39          | 0.623 | .53/.78* | 28          | 0.581 | 0.66 |
|        | NE Corner |                    |                  | 49               | 38          | 0.415 | 0.78     | 29          | 0.564 | 0.66 |
|        | SW End    |                    |                  | 39               | 29          | 0.623 | .53/.78* | 30          | 0.581 | 0.66 |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room           | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |      | Proposed       |       |      |
|--------|----------------|-----------------------|------------------------|------------------------|----------------|-------|------|----------------|-------|------|
|        |                |                       |                        |                        | Avg Calc<br>FC | CU    | LLF  | Avg Calc<br>FC | CU    | LLF  |
| 34-110 | Packing        |                       |                        | 11                     | 18             | 0.76  | 0.68 | 17             | 0.792 | 0.66 |
|        | Paint Shop     |                       |                        | 31                     | 14             | 0.719 | 0.67 | 14             | 0.755 | 0.66 |
|        | Packing Office | Office                | 50                     | 83                     | 138            | 0.473 | 0.68 | 72             | 0.541 | 0.66 |
|        | Prep Room      |                       |                        | 9                      | 10             | 0.721 | 0.68 | 10             | 0.751 | 0.66 |
|        | Prod Line 4    |                       |                        | 20                     | 43             | 0.621 | 0.68 | 40             | 0.645 | 0.66 |
|        | Filing         | Office                | 50                     | 53                     | 37             | 0.783 | 0.68 | 35             | 0.816 | 0.66 |
|        | Filing Office  | Office                | 50                     | 52                     | 93             | 0.496 | 0.68 | 48             | 0.499 | 0.66 |

| Bldg.  | Room       | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |      | Proposed       |       |      |
|--------|------------|-----------------------|------------------------|------------------------|----------------|-------|------|----------------|-------|------|
|        |            |                       |                        |                        | Avg Calc<br>FC | CU    | LLF  | Avg Calc<br>FC | CU    | LLF  |
| 34-120 | 1          | Office                | 50                     | 36                     | 50             | 0.611 | 0.63 | 45             | 0.724 | 0.66 |
|        | 2          | Office                | 50                     | 25                     | 41             | 0.442 | 0.63 | 37             | 0.523 | 0.66 |
|        | 3          | Corridor              | 10                     | 37                     | 41             | 0.386 | 0.58 | 17             | 0.345 | 0.66 |
|        | 4          | Office                | 50                     | 36                     | 64             | 0.707 | 0.58 | 48             | 0.679 | 0.66 |
|        | Storage    | Storage               | 5                      | 47                     | 35             | 0.766 | 0.58 | 6              | 0.751 | 0.66 |
|        | Breakroom  | Lounge                | 15                     | 51                     | 39             | 0.518 | 0.68 | 25             | 0.535 | 0.66 |
|        | Restroom 1 | Toilet                | 20                     | 67                     | 21             | 0.585 | 0.68 | 20             | 0.603 | 0.66 |
|        | Restroom 2 | Toilet                | 20                     | 48                     | 21             | 0.585 | 0.68 | 20             | 0.603 | 0.66 |
|        | Lab        |                       |                        | 44                     | 50             | 0.583 | 0.68 | 53             | 0.583 | 0.66 |
|        | Office 3   | Office                | 50                     | 51                     | 52             | 0.549 | 0.68 | 39             | 0.655 | 0.66 |
|        | Office 4   | Office                | 50                     | 32                     | 90             | 0.454 | 0.63 | 42             | 0.488 | 0.66 |

| Bldg.  | Room         | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |            | Proposed       |       |         |
|--------|--------------|-----------------------|------------------------|------------------------|----------------|-------|------------|----------------|-------|---------|
|        |              |                       |                        |                        | Avg Calc<br>FC | CU    | LLF        | Avg Calc<br>FC | CU    | LLF     |
| 34-140 | Office       | Office                | 50                     | 61                     | 55             | 0.541 | 0.67       | 48             | 0.541 | 0.66    |
|        | Water Ch Tst |                       |                        | 47                     | 41             | 0.385 | 0.68       | 38             | 0.364 | 0.66    |
|        | Boiler       | Mechanical            | 15                     | 29                     | 22             | 0.334 | .66/68.76* | 20             | 0.334 | .50/66* |
|        | Restroom     | Toilet                | 20                     | 23                     | 20             | 0.395 | 0.68       | 21             | 0.395 | 0.66    |
|        | Compres Rm 1 | Mechanical            | 15                     |                        | 26             | 0.566 | 0.66       | 26             | 0.475 | 0.66    |
|        | Compres Rm 2 | Mechanical            | 15                     |                        | 26             | 0.566 | 0.66       | 26             | 0.475 | 0.66    |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |          | LLF          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|------------------|-------------|----------|--------------|-------------|-------|----------|
|        |               |                    |                  |                  | Avg Calc FC | CU       |              | Avg Calc FC | CU    | LLF      |
| 34-910 | Locker Rm 1   | Toilet             | 20               | 27               | 31          | 0.567    | 0.68         | 27          | 0.567 | 0.66     |
|        | Toilet 1      | Toilet             | 20               | 35               | 26          | 0.522    | 0.68         | 23          | 0.522 | 0.66     |
|        | Locker Rm 2   | Toilet             | 20               | 32               | 35          | 0.656    | 0.63         | 34          | 0.656 | 0.66     |
|        | Toilet 2      | Toilet             | 20               | 27               | 32          | 0.574    | 0.63         | 29          | 0.574 | 0.66     |
|        | Paint Shop    |                    | 31               | 17               | 0.332       | .34/.68* | .34/.68*     | 30          | 0.333 | .34/.80* |
|        | Paint Office  | Office             | 50               | 93               | 75          | 0.479    | 0.63         | 45          | 0.6   | 0.67     |
|        | Sign Constr   |                    | 107              | 120              | 120         | 0.614    | 0.63         | 64          | 0.794 | 0.67     |
|        | Ent Office    | Office             | 50               | 75               | 70          | 0.556    | 0.64         | 57          | 0.6   | 0.67     |
|        | PM Conf Rm    | Conference         | 30               | 67               | 74          | 0.427    | 0.68         | 51          | 0.587 | 0.61     |
|        | PM Hallway    | Corridor           | 10               | 75               | 67          | 0.334    | 0.63         | 24          | 0.461 | 0.61     |
|        | PM Office 1   | Office             | 50               | 87               | 70          | 0.34     | 0.63         | 45          | 0.468 | 0.61     |
|        | PM Office 2   | Office             | 50               | 97               | 68          | 0.34     | 0.68         | 43          | 0.468 | 0.61     |
|        | PM Office 3   | Office             | 50               | 77               | 70          | 0.339    | 0.68         | 45          | 0.468 | 0.61     |
|        | WO Central    | Office             | 50               | 42               | 48          | 0.538    | 0.68         | 44          | 0.538 | 0.67     |
|        | WO Office 1   | Office             | 50               | 35               | 37          | 0.401    | 0.68         | 37          | 0.436 | 0.61     |
|        | WO Office 2   | Office             | 50               | 35               | 37          | 0.401    | 0.68         | 37          | 0.143 | 0.61     |
|        | WO Hallway    | Corridor           | 10               | 37               | 32          | 0.143    | 0.68         | 28          | 0.561 | 0.66     |
|        | WO Office 3   | Office             | 50               | 43               | 50          | 0.526    | 0.68         | 50          | 0.564 | 0.61     |
|        | WO Copy Rm    |                    | 56               | 56               | 40          | 0.41     | 0.68         | 25          |       | 0.61     |
|        | WO Storage    | Storage            | 5                | 32               | 22          | 0.396    | 0.74         |             |       |          |
|        | WO BreakRm    | Lounge             | 15               | 128              | 75          | 0.463    | 0.68         | 35          | 0.635 | 0.61     |
|        | WO Secr Area  | Office             | 50               | 95               | 64          | 0.483    | 0.68         | 40          | 0.66  | 0.61     |
|        | WO Microfile  | Office             | 50               | 34               | 44          | 0.511    | 0.68         | 35          | 0.55  | 0.61     |
|        | Micro Storage | Storage            | 5                | 28               | 28          | 0.422    | 0.68         | 17          | 0.46  | 0.61     |
|        | Utility Bkrm  | Lounge             | 15               | 78               | 108         | 0.494    | 0.68         | 27          | 0.536 | 0.66     |
|        | Util Bkrm Kit | Kitchen            | 70               | 56               | 23          | 0.313    | 0.68         | 28          | 0.409 | 0.66     |
|        | Util Office   | Office             | 50               | 53               | 28          | 0.352    | 0.68         | 36          | 0.458 | 0.66     |
|        | Womens Rm     | Toilet             | 20               | 52               | 37          | 0.495    | 0.68         | 33          | 0.495 | 0.66     |
|        | DR Shower     | Toilet             | 20               | 30               | 30          |          |              |             |       |          |
|        | Hall DR 1     | Corridor           | 10               | 25               | 17          | 0.148    | 0.64         | 12          | 0.145 | 0.86     |
|        | Maint Office  | Office             | 50               | 92               | 68          | 0.54     | 0.68         | 32          | 0.588 | 0.7      |
|        | Refrig Shop   |                    | 65               | 65               | 47          | 0.488    | 0.74         | 34          | 0.561 | 0.86     |
|        | Refrig Hall   | Corridor           | 10               | 62               | 38          | 0.385    | .68/.69/.70* | 17          | 0.462 | 0.86     |
|        | ElecShpBkrm   | Lounge             | 15               | 89               | 54          | 0.511    | .67/.68*     | 27          | 0.53  | 0.66     |
|        | ElecWrk Area  |                    | 31               | 31               | 35          | 0.534    | 0.68         | 32          | 0.554 | 0.66     |
|        | Elec Office   | Office             | 50               | 41               | 59          | 0.536    | .68/.73*     | 40          | 0.556 | 0.66     |
|        | Elec Storage  | Storage            | 5                | 43               | 54          | 0.421    | 0.73         | 26          | 0.465 | 0.66     |
|        | Elec Storage  | Storage            | 5                | 31               | 54          |          | 0.73         | 26          |       | 0.66     |
|        | Locksmith     |                    | 109              | 62               | 62          | 0.462    | 0.68         | 54          | 0.729 | 0.66     |
|        | Inst Shp Brk  | Lounge             | 15               | 56               | 53          | 0.516    | 0.68         | 35          | 0.591 | 0.66     |
|        | Inst Wrk Area |                    | 44               | 54               | 54          | 0.516    | 0.68         | 51          | 0.694 | 0.81     |
|        | Inst Entrance | Corridor           | 10               | 50               | 42          | 0.55     | 0.68         | 28          | 0.633 | 0.66     |
|        | Inst Office   | Office             | 50               | 115              | 67          | 0.432    | 0.68         | 44          | 0.593 | 0.69     |
|        | Wash Area     | Toilet             | 20               | 43               | 48          | 0.448    | 0.68         | 25          | 0.511 | 0.66     |
|        | Mill Ent      | Corridor           | 10               | 102              | 62          | 0.565    | 0.69         | 25          | 0.565 | 0.66     |
|        | Mill Office   | Office             | 50               | 55               | 77          | 0.456    | 0.68         | 40          | 0.52  | 0.66     |
|        | Mill Shop     |                    | 35               | 35               | 55          | 0.603    | .67/.68*     | 34          | 0.586 | 0.81     |
|        | T&D BreakRm   | Lounge             | 15               | 52               | 51          | 0.524    | 0.68         | 34          | 0.714 | 0.69     |
|        | T&D Shop      |                    |                  |                  |             |          |              |             |       |          |
|        | BGU Comp      | Computer           | 50               | 38               | 42          | 0.523    | 0.65         | 38          | 0.55  | 0.83     |
|        | BGU Bkrm      | Lounge             | 15               | 148              | 87          | 0.486    | 0.68         | 26          | 0.527 | 0.66     |
|        | BGU Office 1  | Office             | 50               | 63               | 49          | 0.368    | 0.65         | 54          | 0.407 | 0.83     |
|        | BGU Office 2  | Office             | 50               | 50               | 78          | 0.405    | 0.65         | 56          | 0.443 | 0.83     |
|        | BGU Ent       | Corridor           | 10               | 35               | 33          | 0.294    | 0.68         | 19          | 0.331 | 0.69     |
|        | BGU Kitchen   | Kitchen            | 70               | 45               | 30          | 0.385    | 0.68         | 17          | 0.476 | 0.66     |



\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room         | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       |      | Proposed       |       |      |
|--------|--------------|-----------------------|------------------------|------------------------|----------------|-------|------|----------------|-------|------|
|        |              |                       |                        |                        | Avg Calc<br>FC | CU    | LLF  | Avg Calc<br>FC | CU    | LLF  |
| 34-970 | 1            | Office                | 50                     | 71                     | 107            | 0.395 | 0.68 | 50             | 0.544 | 0.66 |
|        | 3            | Office                | 50                     | 90                     | 109            | 0.402 | 0.68 | 50             | 0.554 | 0.66 |
|        | 4            | Office                | 50                     | 60                     | 104            | 0.387 | 0.68 | 60             | 0.533 | 0.66 |
|        | Dir Eng      | Office                | 50                     | 66                     | 77             | 0.59  | 0.68 | 38             | 0.625 | 0.66 |
|        | Admin Office | Office                | 50                     |                        | 69             | 0.446 | 0.68 | 43             | 0.612 | 0.66 |
|        | Conf Room    | Conference            | 30                     | 51                     | 79             | 0.456 | 0.68 | 38             | 0.625 | 0.66 |
|        | File Room    | Office                | 50                     | 57                     | 58             | 0.378 | 0.68 | 19             | 0.521 | 0.66 |
|        | Copier Room  |                       |                        | 28                     | 27             | 0.328 | 0.36 | 30             | 0.334 | 0.66 |
|        | Storage Room | Storage               | 5                      | 30                     | 30             | 0.345 | 0.68 | 26             | 0.345 | 0.66 |
|        | Womens Rm    | Toilet                | 20                     | 32                     | 36             | 0.304 | 0.68 | 19             | 0.311 | 0.66 |
|        | Alcove       |                       |                        | 75                     | 59             | 0.128 | 0.68 | 57             | 0.131 | 0.66 |
|        | Mens Room    | Toilet                | 20                     | 27                     | 9              | 0.304 | 0.82 | 8              | 0.311 | 0.5  |
|        | Kitchen      | Kitchen               | 70                     | 60                     | 23             | 0.485 | 0.68 | 23             | 0.519 | 0.66 |
|        | Hallway      | Corridor              | 10                     | 65                     | 29             | 0.374 | 0.68 | 28             | 0.404 | 0.66 |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room          | AEI Classification | Maximum          |          |  | Present     |       |          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|----------|--|-------------|-------|----------|-------------|-------|----------|
|        |               |                    | Maximum Req'd FC | Meas. FC |  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 44-100 | Cafeteria     | Cafeteria          | 25               | 28       |  | 49          | 0.719 | 0.68     | 32          | 0.816 | 0.66     |
|        | CafCook Area  | Kitchen            | 70               | 72       |  |             |       |          |             |       |          |
|        | Caf Office    | Office             | 50               | 111      |  | 134         | 0.568 | 0.68     | 52          | 0.654 | 0.66     |
|        | Caf Conf      | Conference         | 30               | 184      |  | 90          | 0.536 | 0.68     | 24          | 0.619 | 0.66     |
|        | Caf Office    | Office             | 50               | 121      |  | 82          | 0.536 | 0.68     | 35          | 0.619 | 0.66     |
|        | Restrooms     | Toilet             | 20               |          |  | 16          | 0.983 | 0.77     | 6           | 0.456 | 0.5      |
|        | Caf Hall      | Corridor           | 10               |          |  | 16          | 0.983 | 0.77     | 6           | 0.456 | 0.5      |
|        | Eng Office    | Office             | 50               | 60       |  | 64          | 0.372 | 0.68     | 38          | 0.471 | 0.69     |
|        | PM Office     | Office             | 50               | 43       |  | 64          | 0.372 | 0.68     | 38          | 0.471 | 0.69     |
|        | Admin Office  | Office             | 50               | 75       |  | 75          | 0.535 | 0.68     | 39          | 0.619 | 0.66     |
|        | Dir Office    | Office             | 50               | 82       |  | 79          | 0.444 | 0.68     | 41          | 0.517 | 0.66     |
|        | Coffee Room   | Lounge             | 15               | 75       |  | 53          | 0.403 | 0.68     | 28          | 0.47  | 0.66     |
|        | CAD Office    | Office             | 50               | 68       |  | 59          | 0.38  | 0.68     | 31          | 0.445 | 0.66     |
|        | Office 1      | Office             | 50               | 91       |  | 75          | 0.4   | 0.68     | 44          | 0.508 | 0.69     |
|        | Stats Office  | Office             | 50               | 61       |  | 67          | 0.363 | 0.68     | 35          | 0.425 | 0.66     |
|        | Office 2      | Office             | 50               | 65       |  | 67          | 0.363 | 0.68     | 35          | 0.425 | 0.66     |
|        | Office Hall   | Corridor           | 10               | 50       |  | 56          | 0.265 | 0.68     | 29          | 0.312 | 0.66     |
|        | Main Hall     | Corridor           | 10               | 36       |  | 5           | 0.754 | .68/.77* | 4           | 0.768 | .50/.66* |
|        | Main Office   | Office             | 50               | 66       |  | 38          | 0.642 | 0.68     | 41          | 0.736 | 0.69     |
|        | Office 3      | Office             | 50               | 71       |  | 73          | 0.544 | 0.68     | 37          | 0.627 | 0.66     |
|        | Mens Locker   | Toilet             | 20               | 33       |  | 26          | 0.758 | 0.68     | 24          | 0.771 | 0.66     |
|        | Shower Area   | Toilet             | 20               | 64       |  | 30          | 0.665 | .60/.68* | 22          | 0.681 | .58/.66* |
|        | LockerRm-Old  | Toilet             | 20               | 36       |  | 43          | 0.788 | 0.68     | 39          | 0.8   | 0.66     |
|        | Locker Hall   | Corridor           | 10               |          |  | 27          | 0.61  | .73/.77* | 12          | 0.519 | 0.66     |
|        | Mens Room     | Toilet             | 20               | 80       |  | 37          | 0.768 | 0.73     | 18          | 0.627 | 0.66     |
|        | Mens Shower   | Toilet             | 20               | 40       |  | 23          | 0.459 | 0.68     | 20          | 0.459 | 0.66     |
|        | Women Locker  | Toilet             | 20               | 48       |  | 64          | 0.288 | 0.68     | 41          | 0.288 | 0.66     |
|        | WomShower 1   | Toilet             | 20               | 10       |  | 13          | 0.188 | 0.73     | 18          | 0.446 | 0.66     |
|        | WomShower 2   | Toilet             | 20               | 12       |  | 10          | 0.196 | 0.39     | 13          | 0.464 | .50/.66* |
|        | Wom Bath Lng  | Lounge             | 15               | 50       |  | 24          | 0.597 | 0.68     | 22          | 0.615 | 0.66     |
|        | WomensRm      | Toilet             | 20               | 46       |  | 17          | 0.641 | 0.73     | 16          | 0.541 | 0.66     |
|        | Supply Storag | Storage            | 5                | 40       |  | 46          | 0.656 | 0.68     | 42          | 0.672 | 0.66     |
|        | Supp Filing   | Office             | 50               | 71       |  | 54          | 0.691 | 0.68     | 28          | 0.79  | 0.66     |
|        | Supp Office   | Office             | 50               | 32       |  | 49          | 0.677 | 0.68     | 39          | 0.693 | 0.66     |
|        | Supp Office   | Office             | 50               | 76       |  | 49          |       | 0.68     | 39          |       | 0.66     |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room       | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |            |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 51-420 | 34         | Lounge             | 15               | 90               | 83          | 0.458 | 0.68     | 27          | 0.627 | 0.66     |
|        | 35         | Conference         | 30               | 48               | 77          | 0.422 | 0.68     | 49          | 0.58  | 0.66     |
|        | 33         | Office             | 50               | 46               | 68          | 0.435 | 0.68     | 43          | 0.597 | 0.66     |
|        | 31         | Office             | 50               | 53               | 97          | 0.441 | 0.68     | 43          | 0.605 | 0.66     |
|        | 29         | Office             | 50               | 117              | 83          | 0.414 | 0.68     | 53          | 0.57  | 0.66     |
|        | 32         | Toilet             | 20               | 73               | 34          | 0.448 | .60/.68* | 21          | 0.448 | .58/.66* |
|        | 30         | Toilet             | 20               | 73               | 21          | 0.448 | .60/.68* | 14          | 0.448 | .58/.66* |
|        | Hall 1     | Corridor           | 10               | 15               |             |       |          |             |       |          |
|        | 27         | Office             | 50               | 71               | 70          | 0.435 | 0.68     | 45          | 0.597 | 0.66     |
|        | 25         | Office             | 50               | 117              | 77          | 0.429 | 0.68     | 48          | 0.589 | 0.66     |
|        | 23         | Office             | 50               | 61               | 69          | 0.441 | 0.68     | 43          | 0.605 | 0.66     |
|        | 21         | Office             | 50               | 75               | 70          | 0.435 | 0.68     | 45          | 0.597 | 0.66     |
|        | 22         | Office             | 50               |                  | 77          | 0.429 | 0.68     | 48          | 0.748 | 0.66     |
|        | 20/24      | Storage            | 5                | 205              | 96          | 0.395 | 0.68     | 45          | 0.544 | 0.66     |
|        | 26         | Office             | 50               | 198              | 84          | 0.422 | 0.68     | 51          | 0.58  | 0.66     |
|        | 28         | Office             | 50               | 89               | 61          | 0.45  | 0.68     | 39          | 0.617 | 0.66     |
|        | Mens Room  | Toilet             | 20               | 75               | 91          | 0.409 | 0.68     | 30          | 0.562 | 0.66     |
|        | Womens Rm  | Toilet             | 20               | 70               | 37          | 0.447 | .60/.68* | 21          | 0.614 | .58/.66* |
|        | 7          | Office             | 50               | 21               | 23          | 0.507 | 0.34     | 30          | 0.539 | 0.66     |
|        | Hallway 2  | Corridor           | 10               |                  |             |       |          |             |       |          |
|        | 5          | Office             | 50               | 105              | 82          | 0.458 | 0.68     | 52          | 0.627 | 0.66     |
|        | 3          | Office             | 50               | 96               | 82          | 0.454 | 0.68     | 36          | 0.622 | 0.66     |
|        | 1          | Office             | 50               | 104              | 82          | 0.458 | 0.68     | 53          | 0.627 | 0.66     |
|        | 2          | Office             | 50               | 25               | 39          | 0.422 | 0.68     | 25          | 0.58  | 0.66     |
|        | 4          | Office             | 50               | 118              | 83          | 0.454 | 0.68     | 36          | 0.622 | 0.66     |
|        | 6          | Office             | 50               | 128              | 69          | 0.435 | 0.68     | 44          | 0.597 | 0.66     |
|        | 8          | Office             | 50               | 94               | 69          | 0.435 | 0.68     | 44          | 0.597 | 0.66     |
|        | 10         | Office             | 50               |                  | 69          | 0.435 | 0.68     | 44          | 0.597 | 0.66     |
|        | 9          | Office             | 50               | 84               | 39          | 0.422 | 0.68     | 25          | 0.58  | 0.66     |
|        | 12         | Office             | 50               | 51               | 61          | 0.45  | 0.68     | 39          | 0.617 | 0.66     |
|        | 11         | Office             | 50               | 70               | 62          | 0.446 | 0.68     | 39          | 0.611 | 0.66     |
|        | 14         | Conference         | 30               | 94               | 62          | 0.476 | 0.68     | 39          | 0.652 | 0.66     |
|        | 13         | Office             | 50               | 85               | 56          | 0.458 | 0.68     | 36          | 0.627 | 0.66     |
|        | Comp. Room | Computer           | 50               |                  |             |       |          |             |       |          |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |      |
|--------|-------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|------|
|        |             |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF  |
| 51-430 | Office 1    | Office             | 50               | 86               | 102         | 0.473 | 0.68 | 54          | 0.647 | 0.66 |
|        | Off 1 Shop  |                    |                  | 89               | 62          | 0.452 | 0.72 | 55          | 0.452 | 0.7  |
|        | Restrooms   | Toilet             | 20               |                  | 15          | 0.079 | 0.82 | 10          | 0.069 | 0.5  |
|        | Office 2    | Office             | 50               | 42               |             |       |      |             |       |      |
|        | Office 3    | Office             | 50               | 52               | 43          | 0.432 | 0.68 | 29          | 0.593 | 0.66 |
|        | Off3 RestRm | Toilet             | 20               |                  | 13          | 0.304 | 0.81 | 12          | 0.287 | 0.5  |

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |                  | Proposed    |       |                  |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|------------------|-------------|-------|------------------|
|        |              |                    |                  |                  | Avg Calc FC | CU    | LLF              | Avg Calc FC | CU    | LLF              |
| 53-160 | Main Area    | Office             | 50               | 89               | 57          | 0.554 | 0.68             | 34          | 0.753 | 0.66             |
|        | Office 1     | Office             | 50               | 92               |             |       |                  |             |       |                  |
|        | Office 2     | Office             | 50               | 82               |             |       |                  |             |       |                  |
|        | Office 3     | Office             | 50               | 84               | 52          | 0.463 | 0.68             | 36          | 0.707 | 0.69             |
|        | Break Room   | Lounge             | 15               | 33               | 44          | 0.588 | 0.68             | 42          | 0.623 | 0.66             |
|        | WmnsClot Ret |                    |                  | 17               |             |       |                  |             |       |                  |
|        | Womens Rm    | Toilet             | 20               | 25               | 30          | 0.397 | .60/.68*         | 26          | 0.475 | .58/.64*         |
|        | Womens Lckr  | Toilet             | 20               | 27               | 26          | 0.456 | .68/.76/.81/.82* | 21          | 0.547 | .50/.64/.66*     |
|        | Janitor      | Janitor            | 5                | 22               |             |       |                  |             |       |                  |
|        | Office 4     | Office             | 50               |                  |             |       |                  |             |       |                  |
|        | Store Room   | Storage            | 5                | 39               | 50          | 0.304 | 0.68             | 30          | 0.419 | 0.66             |
|        | Alcove 1     |                    |                  | 41               |             |       |                  |             |       |                  |
|        | MensClotRet  |                    |                  | 45               |             |       |                  |             |       |                  |
|        | Mens Room    | Toilet             | 20               | 61               | 30          | 0.397 | .60/.68*         | 26          | 0.475 | .58/.64*         |
|        | Mens Locker  | Toilet             | 20               | 37               | 48          | 0.468 | .60/.68/.81*     | 30          | 0.641 | .50/.58/.64/.66* |
|        | Com RestRm   | Toilet             | 20               |                  |             |       |                  |             |       |                  |
|        | Hallway      | Corridor           | 10               | 67               | 24          | 0.325 | 0.68             | 14          | 0.449 | 0.66             |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 60-020 | Provost       | Office             | 50               | 34               | 48          | 0.521 | 0.58     | 44          | 0.512 | 0.69     |
|        | Security Spec | Office             | 50               | 48               | 47          | 0.521 | 0.58     | 44          | 0.512 | 0.69     |
|        | 103           | Office             | 50               | 27               | 41          | 0.458 | 0.58     | 54          | 0.428 | 0.69     |
|        | 105           | Office             | 50               | 39               | 38          | 0.531 | 0.68     | 47          | 0.567 | 0.69     |
|        | 105a          | Office             | 50               | 24               | 20          | 0.442 | 0.58     | 36          | 0.471 | 0.69     |
|        | 107           | Office             | 50               | 13               | 16          | 0.515 | 0.58     | 28          | 0.536 | 0.69     |
|        | 102           | Office             | 50               | 32               | 24          | 0.559 | 0.58     | 44          | 0.575 | 0.69     |
|        | 104           | Office             | 50               | 31               | 30          | 0.458 | 0.58     | 34          | 0.492 | 0.69     |
|        | Break Room    | Lounge             | 15               | 15               | 15          | 0.528 | 0.58     | 23          | 0.512 | 0.69     |
|        | Mens Room     | Toilet             | 20               | 23               | 11          | 0.559 | 0.68     | 12          | 0.559 | 0.69     |
|        | Womens Rm     | Toilet             | 20               | 11               | 11          | 0.559 | 0.68     | 12          | 0.559 | 0.69     |
|        | Hallways      | Corridors          | 10               | 80               | 5           | 0.725 | .68/.76* | 2           | 0.807 | .69/.76* |
|        | Training      |                    |                  | 30               | 26          | 0.521 | 0.68     | 24          | 0.638 | 0.66     |
|        | LockerRm 1    | Toilet             | 20               | 37               | 40          | 0.509 | 0.68     | 21          | 0.589 | 0.66     |
|        | Foyer         |                    |                  | 27               | 38          | 0.342 | 0.68     | 36          | 0.357 | 0.66     |
|        | 109           |                    |                  | 70               | 41          | 0.542 | 0.58     | 34          | 0.567 | 0.66     |
|        | 110           | Office             | 50               | 56               | 53          | 0.474 | 0.68     | 41          | 0.536 | 0.66     |
|        | Radio Room    | Office             | 50               | 27               | 80          | 0.431 | 0.68     | 47          | 0.5   | 0.66     |
|        | LockerRm 2    | Toilet             | 20               | 23               | 58          | 0.558 | 0.68     | 30          | 0.643 | 0.66     |

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 60-060 | Break Rm      | Lounge             | 15               | 85               | 56          | 0.494 | 0.68     | 35          | 0.676 | 0.66     |
|        | Hallway       | Corridor           | 10               | 53               | 33          | 0.32  | 0.68     | 29          | 0.32  | 0.66     |
|        | Mens Rm       | Toilet             | 20               | 20               | 54          | 0.282 | .68/.81* | 35          | 0.388 | .50/.66* |
|        | Womens Rm     | Toilet             | 20               | 59               | 39          | 0.306 | .60/.68* | 33          | 0.306 | .58/.66* |
|        | Janitor       | Janitor            | 5                | 10               | 11          | 0.079 | 0.81     | 10          | 0.069 | 0.5      |
|        | 6             | Office             | 50               | 67               | 53          | 0.39  | 0.68     | 39          | 0.593 | 0.69     |
|        | Open Office   | Office             | 50               | 67               | 63          | 0.511 | 0.68     | 48          | 0.783 | 0.69     |
|        | 5             | Office             | 50               | 7                | 46          | 0.416 | 0.68     | 34          | 0.634 | 0.69     |
|        | 6             | Office             | 50               | 66               | 45          | 0.416 | 0.68     | 33          | 0.634 | 0.69     |
|        | Storage       | Storage            | 5                | 24               | 28          | 0.424 | 0.68     | 25          | 0.424 | 0.66     |
|        | 3             | Office             | 50               | 61               | 58          | 0.456 | 0.68     | 43          | 0.696 | 0.69     |
|        | Open Area 1   | Office             | 50               | 84               | 59          | 0.507 | 0.68     | 44          | 0.776 | 0.69     |
|        | 2             | Office             | 50               | 76               | 57          | 0.419 | 0.68     | 42          | 0.638 | 0.69     |
|        | 1             | Office             | 50               | 102              | 57          | 0.456 | 0.68     | 42          | 0.696 | 0.69     |
|        | EntHall&Alcov | Corridor           | 10               | 53               | 21          | 0.403 | .68/.81* | 18          | 0.403 | .50/.66* |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room           | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |              | Proposed    |       |      |
|--------|----------------|--------------------|------------------|------------------|-------------|-------|--------------|-------------|-------|------|
|        |                |                    |                  |                  | Avg Calc FC | CU    | LLF          | Avg Calc FC | CU    | LLF  |
| 60-070 | Cotton Storage | Storage            | 5                | 102              | 101         | 0.338 | .67/.68*     | 47          | 0.471 | 0.66 |
|        | Office         | Office             | 50               | 19               | 12          | 0.252 | 0.68         | 37          | 0.349 | 0.66 |
|        | Shower         | Toilet             | 20               | 50               | 27          | 0.367 | 0.68         | 24          | 0.367 | 0.66 |
|        | Mens Locker    | Toilet             | 20               | 35               | 12          | 0.271 | 0.68         | 25          | 0.377 | 0.66 |
|        | Womens Shwr    | Toilet             | 20               | 50               |             |       |              |             |       | 0.66 |
|        | Hallway        | Corridor           | 10               |                  | 8           | 0.217 | 0.68         | 12          | 0.303 | 0.66 |
|        | Mens Rm        | Toilet             | 20               | 25               | 31          | 0.331 | 0.68         | 25          | 0.46  | 0.66 |
|        | Repair Stn     |                    |                  | 21               | 37          | 0.378 | .67/.68/.69* | 29          | 0.378 | 0.66 |
|        | Control Rm     |                    |                  |                  | 4           | 0.59  | 0.68         | 4           | 0.59  | 0.66 |

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|-------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |             |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 60-090 | Office 1    | Office             | 50               | 55               | 56          | 0.625 | 0.51     | 46          | 0.699 | 0.73     |
|        | Main Office | Office             | 50               | 55               | 56          | 0.625 | 0.51     | 46          | 0.699 | 0.73     |
|        | Entrance    | Corridor           | 10               | 69               | 42          | 0.428 | 0.51     | 22          | 0.463 | 0.66     |
|        | Office 2    | Office             | 50               | 37               | 49          | 0.438 | 0.51     | 41          | 0.497 | 0.73     |
|        | File Area   | Office             | 50               | 50               | 40          | 0.536 | 0.51     | 47          | 0.576 | 0.63     |
|        | Office 3    | Office             | 50               | 38               | 42          | 0.4   | 0.51     | 35          | 0.455 | 0.73     |
|        | Kitchen     | Kitchen            | 70               | 54               | 47          | 0.38  | 0.51     | 35          | 0.414 | 0.66     |
|        | Hallway     | Corridor           | 10               | 57               | 42          | 0.428 | 0.51     | 22          | 0.463 | 0.66     |
|        | Womens Rm   | Toilet             | 20               | 50               | 5           | 0.077 | .73/.75* | 7           | 0.103 | .50/.63* |
|        | Mens Rm     | Toilet             | 20               | 21               | 6           | 0.071 | .73/.75* | 7           | 0.095 | .50/.63* |

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 60-630 | Warehouse     |                    |                  | 6                | 13          | 0.803 | 0.71     |             |       |          |
|        | Shipping Pred |                    |                  | 8                | 11          | 0.591 | 0.73     | 27          | 0.537 | 0.66     |
|        | Break Room    | Lounge             | 15               | 50               | 43          | 0.427 | 0.68     | 27          | 0.587 | 0.66     |
|        | Womens Rm     | Toilet             | 20               | 35               | 14          | 0.403 | 0.68     | 13          | 0.403 | 0.66     |
|        | Mens Rm       | Toilet             | 20               | 35               | 17          | 0.414 | .68/.82* | 14          | 0.414 | .50/.66* |
|        | Mens Showers  | Toilet             | 20               | 3                |             | 0.414 | 0.414    |             | 0.414 |          |
|        | Storage Rm    | Storage            | 5                | 13               | 15          | 0.283 | 0.68     | 14          | 0.283 | 0.66     |
|        | Office        | Office             | 50               | 42               | 34          | 0.391 | 0.68     | 31          | 0.391 | 0.66     |

• Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room          | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |      |
|--------|---------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|------|
|        |               |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF  |
| 63-100 | Office 1      | Office             | 50               | 45               | 83          | 0.557 | .68/.69* | 58          | 0.578 | 0.66 |
|        | Womens Rm     | Toilet             | 20               | 37               | 36          | 0.384 | 0.68     | 33          | 0.397 | 0.66 |
|        | Office 2      | Office             | 50               | 72               | 56          | 0.394 | 0.68     | 36          | 0.458 | 0.81 |
|        | Mask-SuitDist |                    |                  | 32               | 51          | 0.56  | 0.68     | 30          | 0.761 | 0.66 |
|        | Training Rm   |                    |                  | 29               |             |       |          |             |       |      |
|        | Hall 1        | Corridor           | 10               | 45               | 61          | 0.334 | 0.68     | 15          | 0.346 | 0.66 |
|        | Mens Rm       | Toilet             | 20               | 47               | 27          | 0.456 | 0.68     | 13          | 0.472 | 0.66 |
|        | Change Rm     | Toilet             | 20               | 37               | 44          | 0.503 | 0.68     | 40          | 0.522 | 0.66 |
|        | Hall 2        | Corridor           | 10               | 20               | 47          | 0.456 | 0.68     | 17          | 0.473 | 0.66 |
|        | Break Rm      | Lounge             | 15               | 18               | 30          | 0.743 | 0.69     | 25          | 0.743 | 0.66 |
|        | Storage Area  | Storage            | 5                | 47               | 30          | 0.743 | 0.69     | 25          | 0.743 | 0.66 |
|        | Clean Rm      |                    |                  | 112              | 94          | 0.807 | .67/.69* | 70          | 0.807 | 0.66 |

| Bldg.  | Room        | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |      | Proposed    |       |          |
|--------|-------------|--------------------|------------------|------------------|-------------|-------|------|-------------|-------|----------|
|        |             |                    |                  |                  | Avg Calc FC | CU    | LLF  | Avg Calc FC | CU    | LLF      |
| 63-110 | Layout 1    |                    |                  | 37               | 45          | 0.599 | 0.68 | 31          | 0.81  | .70/.74* |
|        | Layout 2    |                    |                  | 62               | 42          | 0.805 | 0.67 | 21          | 0.796 | 0.69     |
|        | Testing     |                    |                  | 40               |             |       |      |             |       |          |
|        | Bonding     |                    |                  | 47               | 51          | 0.47  | 0.68 | 48          | 0.628 | 0.7      |
|        | Storage A   | Storage            | 5                | 58               | 59          | 0.47  | 0.68 | 15          | 0.509 | 0.7      |
|        | Smoke Break | Lounge             | 15               | 39               | 74          | 0.406 | 0.68 | 37          | 0.559 | 0.74     |
|        | Break Rm    | Lounge             | 15               | 49               | 45          | 0.458 | 0.68 | 22          | 0.627 | 0.74     |
|        | 2 Bathrooms | Toilets            | 20               | 20               | 21          | 0.469 | 0.68 | 18          | 0.469 | 0.7      |
|        | Storage B   | Storage            | 5                | 48               | 42          | 0.436 | 0.68 | 21          | 0.436 | 0.7      |
|        | Office      | Office             | 50               | 89               | 72          | 0.353 | 0.68 | 46          | 0.486 | 0.74     |

| Bldg.  | Room            | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |          | Proposed    |       |          |
|--------|-----------------|--------------------|------------------|------------------|-------------|-------|----------|-------------|-------|----------|
|        |                 |                    |                  |                  | Avg Calc FC | CU    | LLF      | Avg Calc FC | CU    | LLF      |
| 63-120 | Loading Area 1  |                    |                  | 10               | 14          | 0.733 | .53/.69* | 14          | 0.733 | .53/.69* |
|        | Restroom 1      | Toilet             | 20               | 30               | 25          | 0.437 | 0.68     | 22          | 0.437 | 0.66     |
|        | Restrm2/Chng    | Toilet             | 20               | 80               |             | 0.609 |          |             | 0.609 |          |
|        | Machine Shp     |                    |                  | 30               |             |       |          |             |       |          |
|        | Radioactive stg |                    |                  | 56               | 69          | 0.361 | 0.68     | 24          | 0.497 | 0.66     |
|        | Office          | Office             | 50               | 30               | 54          | 0.39  | 0.68     | 37          | 0.537 | 0.66     |
|        | ToolRm Office   | Office             | 50               | 50               | 15          | 0.549 | 0.68     | 15          | 0.57  | 0.73     |
|        | Break Rm        | Lounge             | 15               | 42               | 40          | 0.434 | 0.68     | 24          | 0.596 | 0.66     |

\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room       | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       | Proposed |                |       |          |
|--------|------------|-----------------------|------------------------|------------------------|----------------|-------|----------|----------------|-------|----------|
|        |            |                       |                        |                        | Avg Calc<br>FC | CU    | LLF      | Avg Calc<br>FC | CU    | LLF      |
| 63-200 | Main Area  | Office                | 50                     | 112                    | 40             | 0.607 | 0.68     | 44             | 0.795 | .67/.69* |
|        | Break Rm   | Lounge                | 15                     | 34                     | 55             | 0.543 | 0.68     | 33             | 0.738 | 0.66     |
|        | Mens Rm    | Toilet                | 20                     | 44                     |                |       |          |                |       |          |
|        | Womens Rm  | Toilet                | 20                     | 44                     |                |       |          |                |       |          |
|        | Mask Insp  |                       |                        | 48                     |                |       |          |                |       |          |
|        | Storage Rm | Storage               | 5                      | 20                     | 38             | 0.46  | 0.68     | 36             | 0.494 | 0.66     |
|        | Office 1   | Office                | 50                     | 35                     | 31             | 0.516 | 0.68     | 30             | 0.55  | 0.66     |
|        | Office 2   | Office                | 50                     | 49                     | 37             | 0.6   | 0.68     | 35             | 0.635 | 0.66     |
|        | Tool Rm    |                       |                        | 43                     |                |       |          |                |       |          |

| Bldg.  | Room          | AEI<br>Classification | Maximum<br>Req'd<br>FC | Maximum<br>Meas.<br>FC | Present        |       | LLF      | Proposed       |       |          |
|--------|---------------|-----------------------|------------------------|------------------------|----------------|-------|----------|----------------|-------|----------|
|        |               |                       |                        |                        | Avg Calc<br>FC | CU    |          | Avg Calc<br>FC | CU    |          |
| 63-210 | Main Area     | Office                | 50                     | 122                    | 59             | 0.891 | 0.69     | 44             | 0.891 | 0.66     |
|        | M43 Test Prep |                       |                        | 40                     | 53             | 0.715 | 0.68     | 48             | 0.729 | 0.66     |
|        | Storage Rms   | Storage               | 5                      | 31                     | 15             | 0.603 | 0.69     | 15             | 0.603 | 0.66     |
|        | Drying Rm     |                       |                        |                        | 4              | 0.333 | 0.76     |                |       |          |
|        | Break Rm      | Lounge                | 15                     | 48                     | 28             | 0.722 | .68/.76* | 26             | 0.736 | .66/.76* |
|        | Office1       | Office                | 50                     | 45                     | 35             | 0.672 | 0.68     | 32             | 0.688 | 0.66     |



\* Multiple Fixtures Used

Pine Bluff Arsenal Bldg Summary

| Bldg.  | Room         | AEI Classification | Maximum Req'd FC | Maximum Meas. FC | Present     |       |              | Proposed    |       |              |
|--------|--------------|--------------------|------------------|------------------|-------------|-------|--------------|-------------|-------|--------------|
|        |              |                    |                  |                  | Avg Calc FC | CU    | LLF          | Avg Calc FC | CU    | LLF          |
| 63-410 | Entrance     |                    |                  |                  | 5           | 0.166 | 0.68         | 11          | 0.462 | 0.72         |
|        | Alcove       |                    |                  | 13               | 7           | 0.038 | 0.68         | 13          | 0.158 | 0.72         |
|        | Locker Rm 1  | Toilet             | 20               | 40               | 23          | 0.624 | .60/.68*     | 22          | 0.655 | .60/.72*     |
|        | Shower 1     | Toilet             | 20               | 14               | 14          | 0.535 | 0.68         | 13          | 0.535 | 0.67         |
|        | Locker Rm 2  | Toilet             | 20               | 26               | 16          | 0.47  | .60/.68*     | 15          | 0.478 | .60/.72*     |
|        | Alcove 2     |                    |                  | 20               |             |       |              |             |       |              |
|        | Rest Rm 1    | Toilet             | 20               | 30               | 23          | 0.379 | .60/.68*     | 14          | 0.38  | .60/.66*     |
|        | Shower 2     | Toilet             | 20               | 14               | 15          | 0.472 | 0.68         | 14          | 0.472 | 0.69         |
|        | Alcove 3     |                    |                  | 6                |             |       |              |             |       |              |
|        | Alcove 4     |                    |                  | 6                | 7           | 0.081 | 0.62         |             |       |              |
|        | Alcove 5     |                    |                  | 5                | 8           | 0.049 | 0.62         |             |       |              |
|        | Alcove 6     |                    |                  | 9                | 8           | 0.049 | 0.68         |             |       |              |
|        | Open Ape     |                    |                  | 28               | 9           | 0.548 | .60/.68*     | 12          | 0.553 | .60/.67*     |
|        | Rest Rm 2    | Toilet             | 20               | 26               | 9           | 0.548 | .60/.68*     | 12          | 0.553 | .60/.67*     |
|        | Alcove 7     |                    |                  | 26               | 16          | 0.166 | 0.68         | 14          | 0.191 | 0.72         |
|        | Hallway 1    | Corridor           | 10               | 18               | 10          | 0.322 | 0.68         | 9           | 0.324 | 0.67         |
|        | Office 1     | Office             | 50               | 23               | 22          | 0.468 | .60/.68*     | 38          | 0.411 | .60/.66*     |
|        | Kitchen      | Kitchen            | 70               | 25               | 22          | 0.468 | .60/.68*     | 38          | 0.411 | .60/.66*     |
|        | Break Rm     | Lounge             | 15               | 22               | 20          | 0.631 | 0.68         | 26          | 0.544 | 0.66         |
|        | Office 3     | Office             | 50               | 22               | 8           | 0.183 | 0.68         | 33          | 0.444 | 0.66         |
|        | Office 4     | Office             | 50               | 35               | 8           | 0.183 | 0.68         | 33          | 0.444 | 0.66         |
|        | Rest Rm 3    | Toilet             | 20               | 32               | 18          | 0.474 | .60/.62/.68* | 17          | 0.483 | .60/.62/.72* |
|        | Alcove 8     |                    |                  | 7                |             |       |              |             |       |              |
|        | Hallway 2    | Corridor           | 10               | 20               | 10          | 0.433 | .62/.68*     | 9           | 0.437 | .62/.67*     |
|        | Rest Rm 4    | Toilet             | 20               | 20               | 10          | 0.146 | .60/.68*     | 18          | 0.395 | .60/.72*     |
|        | Alcove(WRR)  |                    |                  | 10               | 9           | 0.089 | 0.62         |             |       |              |
|        | Entrance 2   |                    |                  | 15               | 4           | 0.137 | 0.68         | 9           | 0.365 | 0.67         |
|        | Alcove 9     |                    |                  |                  | 7           | 0.078 | 0.62         |             |       |              |
|        | Lutance Room |                    |                  | 35               | 19          | 0.63  | .60/.68*     | 19          | 0.664 | .60/.72*     |
|        | Showers      | Toilet             | 20               | 15               | 12          | 0.541 | .62/.68*     | 11          | 0.541 | .62/.67*     |
|        | Alcove 10    |                    |                  | 5                | 9           | 0.25  | 0.62         |             |       |              |
|        | Open Area 2  |                    |                  | 32               | 17          | 0.451 | 0.68         | 15          | 0.458 | 0.72         |
|        | Rest Rm 5    | Toilet             | 20               | 33               | 20          | 0.379 | 0.68         | 17          | 0.38  | .58/.72*     |
|        | Alcove 11    |                    |                  | 7                |             |       |              |             |       |              |
|        | WmnsLckr Rm  | Toilet             | 20               | 21               | 18          | 0.584 | .60/.68*     | 17          | 0.608 | .58/.72*     |
|        | Wmns Showrs  | Toilet             | 20               | 13               | 13          | 0.533 | 0.68         | 12          | 0.533 | 0.66         |
|        | Rest Rm 6    | Toilet             | 20               | 17               | 19          | 0.402 | .60/.68*     | 17          | 0.387 | .58/.72*     |
|        | Alcove 12    |                    |                  |                  | 10          | 0.375 | 0.68         | 10          | 0.376 | 0.72         |
|        | Alcove 13    |                    |                  |                  | 8           | 0.094 | 0.62         |             |       |              |
|        | Ice Mach Rm  |                    |                  | 25               | 8           | 0.407 | .62/.68*     | 18          | 0.41  | .62/.72*     |
|        | Cithng Issue |                    |                  | 24               | 12          | 0.172 | 0.68         | 27          | 0.482 | 0.72         |
|        | Mask Storage | Storage            |                  | 14               | 22          | 0.514 | 0.68         | 21          | 0.527 | 0.72         |

COMMENTS  
DOCUMENTATION CHECKLIST

| ITEM | COMMENT  |
|------|--|
| E-6  | <p>Standard ballasts to be removed may contain PCBs, especially if manufactured before 1978. To meet federal hazardous waste disposal requirements, PCB-containing ballasts must be sealed in EPA-approved drums and either sent to approved storage sites or incinerated.</p> <p>Ballasts that are removed and are in good working order, and do not contain PCBs are to be placed in box containers and returned to Pine Bluff Arsenal.</p> <p>Lamps that are removed and are in good working order are to be placed in box containers and returned to Pine Bluff Arsenal.</p> <p>Disposal of lamps that are removed and that are not in good working order must be coordinated with Pine Bluff Arsenal, Environmental Compliance.</p> |

COMMENTS  
TECHNICAL DATA CHECKLIST

| ITEM | COMMENT   |
|------|---|
| E-1  | <p>Standard ballasts to be removed may contain PCBs, especially if manufactured before 1978. To meet federal hazardous waste disposal requirements, PCB-containing ballasts must be sealed in EPA-approved drums and either sent to approved storage sites or incinerated.</p> <p>Ballasts that are removed and are in good working order, and that do not contain PCBs are to be placed in box containers and returned to Pine Bluff Arsenal.</p> <p>Lamps that are removed and are in good working order are to be placed in box containers and returned to Pine Bluff Arsenal.</p> <p>Disposal of lamps that are removed and that are not in good working order must be coordinated with Pine Bluff Arsenal, Environmental Compliance.</p> |